



OLIVER S. FLINT, JR.

*Studies of Neotropical  
Caddisflies, X:  
Leucotrichia and  
Related Genera from  
North and Central  
America (Trichoptera:  
Hydroptilidae)*

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## ABSTRACT

Flint, Oliver S., Jr. Studies of Neotropical Caddisflies, X: *Leucotrichia* and Related Genera from North and Central America (Trichoptera: Hydroptilidae). *Smithsonian Contributions to Zoology*, 60:1-64, 1970.—The history of the suprageneric classification within the Hydroptilidae is reviewed and the subfamily Leucotrichinae is established for an exclusively New World group of genera: *Leucotrichia* Mosely, *Peltopsycha* Müller, *Zumatrichia* Mosely, *Costatrichia* Mosely, *Abtrichia* Mosely, *Acostatrichia* Mosely, *Betrichia* Mosely, *Alisotrichia* Flint, and *Anchitrichia*, new genus. Five genera, all restricted to North and Central America and the West Indies, are keyed and characterized, both for the adult and larval stage. *Leucotrichia*, the type genus of the subfamily, contains ten species, four described as new, and is known from all sections. *Costatrichia* contains six species, four described as new, and is known from Central America only. *Anchitrichia*, containing only *spangleri*, new species, is described as new and is known from throughout Central America. *Zumatrichia*, containing nineteen species, thirteen described as new, is the largest genus and is abundant in Central America and the Lesser Antilles, with one species *Z. notosa* (Ross) (new combination) found in Montana. *Alisotrichia* contains twelve species, five described as new, and is known from Central America and the West Indies. Each species is keyed, figured, described, its affinities discussed, and its distribution given. The larvae are described for the species for which this stage is known.

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Oliver S. Flint, Jr.

## Studies of Neotropical Caddisflies, X: *Leucotrichia* and Related Genera from North and Central America (Trichoptera: Hydroptilidae)

Most species of Hydroptilidae, commonly known as the microcaddisflies, are no longer than a millimeter or two. Because of their small size, they are usually ignored by collectors, and as a consequence a misleading picture of their true diversity is presented in many parts of the world. In those countries where they have been extensively collected, however, they comprise a large portion of the trichopterous fauna both in number of species and abundance of individuals. In the New World as the hydroptilids are being more intensively studied, they are found to be a very large family; for instance, on some of the Lesser Antillean islands (Flint, 1968b) over fifty percent of the species of Trichoptera are Hydroptilidae.

*Leucotrichia* and allied genera is one group of hydroptilids that has a great diversity of species, especially in Mesoamerica where the species breed in fast-flowing streams and rivers. In North America and the West Indies, in contrast, there are only a few species. Most of the mountainous regions of northern and western South America have not been well collected, but what little evidence is available suggests that here also the fauna is much reduced. The highlands of south-

eastern Brazil, however, are apparently well populated with related genera and species (Mosely, 1939).

The present study is intended to review the few known species, to describe the many new species, and to bring together the meager information on the biology and immature stages of *Leucotrichia* and related genera from North and Central America (including Panama) and the West Indies.

I wish to thank D. E. Kimmins of the British Museum (Natural History) and H. H. Ross of the Illinois Natural History Survey for the loan of types from their respective collections.

The majority of the material reported on in this paper was collected by me in Central America on trips made possible by grant GB-2616 from the National Science Foundation. The collecting trip to Jamaica and the Lesser Antilles in 1963 was made possible by grant J-481 from the American Philosophical Society. Additional valuable Central American material was collected by P. J. Spangler and W. D. Duckworth during their trips into Latin America. H. H. Ross loaned material collected in Costa Rica by R. T. Allen.

I am indebted to the staff artists of the Department of Entomology, Smithsonian Institution, for their fine illustrations—Mr. Andre D. Pizzini for the habitus views of the larvae, and Mrs. Elsie M. Froeschner for the detailed drawings of the larval head capsules.

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### Classification

The suprageneric classification of the Hydroptilidae is very unsatisfactory. The few preliminary attempts to divide the family have been based primarily on the distinctive larval morphology and habits of one or a few genera in a particular region of the world. Although the technique has undoubtedly resulted in the segregation of valid suprageneric units, it has also resulted in the typical subfamily remaining a catchall of genera that were not or could not be placed. A rectification of this situation is still not possible; however, a review will be useful as background for further action.

Nielsen (1948) proposed the subfamilies Orthotrichinae (for *Orthotrichia* and *Ithytrichia*) and Hydroptilinae (for *Agraylea*, *Hydroptila*, and *Oxyethira*) based on larval morphology and behavior. Although this action assigned all the Danish genera to two natural units, none of the extraterritorial genera could be assigned, and these genera must therefore fall into the Hydroptilinae, rendering this subfamily very heterogeneous.

Botosaneanu (1956) established the Stactobiinae for *Stactobia* and "les genres etroitement apparentes (*Stactobiella* Mart, etc.)." The larvae of *Stactobiella* (Ross, 1944, as *Tascobia*), however, show that this genus is not related to *Stactobia*, but should probably be placed in the Hydroptilinae (sensu Nielsen). Ulmer (1957) described the larvae of a number of Indonesian genera, of which those of *Plethus* and *Lamongonotrichia* clearly show that these genera belong in the Stactobiinae.

The family was again divided in 1956, this time by Ross, but into the Ptilocolepinae (for *Ptilocolepus* and *Paleagapetus*) and the Hydroptilinae for all the remaining genera. The Ptilocolepinae appears to be a natural unit (see also Flint, 1962), but the Hydroptilinae is still very heterogeneous.

On the basis of larval morphology and habits, one of the most aberrant units remaining in the Hydroptilinae (no matter how defined) is that of *Leucotrichia* and related genera. To accept this distinctive unit I propose the subfamily Leucotrichinae; the type genus is *Leucotrichia* Mosely (1934). The subfamily will also contain *Peltopsyche* Müller (1880), *Zumatrichia* Mosely (1937), *Costatrichia* Mosely (1937), *Abtrichia* Mosely (1939), *Acostatrichia* Mosely (1939), *Betrichia* Mosely (1939), *Alisotrichia* Flint (1964), and *Anchitrichia*, new genus, all from the New World.

I can give no single characteristic by which the adults can be distinguished without fail from those of other subfamilies. A number of characteristics are diagnostic, however, when present: reduction of ocelli to two, presence of modified setae, flaps or sclerites on the head (but not associated with the posterior warts), modifications of the antennal segments especially the basal ones, or the presence of a reflexed costal cell. There is also something characteristic in the form of the male genitalia, although this is hard to define verbally.

The larvae are very different from those of all other New World genera, although they are similar to those of certain exotic genera (i.e., Stactobiinae). From all other known New World larvae they differ in possessing large sclerites on 8 or 9 abdominal segments, and from all except *Paleagapetus*, in having only the pronotum (and rarely the mesonotum and metanotum) divided longitudinally, in having all legs short and stout and rather similar in structure, and in having the submentum divided. As mentioned above they are very similar to the larvae of the Stactobiinae, but apparently the larvae of the latter differ in having all thoracic nota divided.

The subfamily is, however, absolutely distinctive in the type and use made of the larval and pupal shelter—the characteristics that primarily cause me to establish the subfamily. In none of the genera for which the characteristics are known is the larval shelter more than a dorsal covering nor is it ever movable, and conversely, no genus elsewhere possesses these characteristics.

Within the subfamily there are two definite units, one containing *Alisotrichia*, and the other all the remaining genera (based on supposition in some genera). *Alisotrichia* is distinctive on the shape of the aedeagus in the male, seventh tergum and bursa copulatrix in the female, fusiform shape of the larvae, and type of larval shelter. The last characteristic is most interesting and merits more mention here. The larva appears to be free-living up to the end of the last instar, at which time it spins a simple, silken, dorsal covering with a few small lateral openings (perhaps for water circulation). It then immediately constructs a complete central cocoon, enclosing itself for pupation. I have seen no indication that the larva ever lives as an active, feeding organism within this shelter.

The second and possibly more advanced stage of shelter construction is typified by *Leucotrichia*. In this

and related genera the larva constructs at or near the beginning of the last instar a shelter that contains an opening at both ends. Within this shelter the larva lives and grows with its middle abdominal segments becoming greatly distended. It extends its head and slender segments out of one opening or the other to feed, but otherwise is restricted to the site of the shelter (Lloyd, 1915). At the end of the instar the inner cocoon is spun and pupation takes place.

The following keys are only to those genera and species known to occur in North and Central America and the West Indies. There seems to be a typical form to the male genitalia in most genera that is difficult to state in a few words: the figures will convey this form most clearly. I have made no attempt to assign females to most species, because so few can be unequivocally assigned to the proper male.

### Key to Genera of *Leucotrichinae*

#### ADULTS

1. Males with aedeagus simply constricted at midlength; female with dorsum of seventh segment variously modified, with a simple ringlike bursa. . . . . *Alisotrichia*  
Males with aedeagus not only constricted at midlength, but also bearing a complex dorsal structure here; females with seventh tergum simple, bursa complex with sclerotized supports . . . . . 2
2. Antenna of male with basal segment enlarged and flattened and covering half of face; ocelli 2 . . . . . *Zumatrichia*  
Basal antennal segment terete (segments beyond may be flattened); ocelli 2 or 3 . . . . . 3
3. Lateral penis sheaths small, semimembranous; subgenital plate connected dorsally to tenth tergites, produced into a ventral process which at base of claspers articulates with a structure lying in a dorsomesal groove of approximate claspers. . . . . *Leucotrichia*  
Lateral penis sheaths generally large, produced posteriad, sclerotized; subgenital plate generally lacking, or of different structure; claspers widely separated. . . . . 4
4. Ocelli 2; clasper with several stout apicodorsal setae. . . . . *Anchitrichia*  
Ocelli 3; clasper without enlarged setae. . . . . *Costatrichia*

#### LARVAE\*

1. Abdominal segments not greatly enlarged. . . . . *Alisotrichia*  
Middle abdominal segments greatly enlarged. . . . . 2
2. Anterolateral angle of pronotum produced anteriorly. . . . . *Anchitrichia*  
Anterolateral angle of pronotum not produced. . . . . 3
3. Ninth tergite with short enlarged setae laterally, abdominal tergites 2-7 with 2 central pores. . . . . *Zumatrichia*  
Ninth tergite generally lacking enlarged setae, but when present arranged in a transverse anterior band; abdominal tergites without central pores. . . . . *Leucotrichia*

\*Larvae of *Costatrichia* unknown, but probably with enlarged abdominal segments.

### Genus *Leucotrichia* Mosely

*Leucotrichia* Mosely, 1934, p. 157.—Ross, 1944, p. 120.—Denning, 1956, p. 255. [Type species: *Leucotrichia melleopicta* Mosely, 1934, by original designation.]

ADULT.—Ocelli 2 or 3. Spurs 1, 3, 4. Pronotum with anterior surface heavily sclerotized, elongate. Mesoscutellum with a transverse suture; metascutellum pentagonal. Male genitalia: Eighth sternum produced posteroventrally with a posteromesal division. Ninth segment completely open ventrally; posterolateral margin with a row of stout setae. Tenth tergite (?)

a heavily sclerotized trianguloid plate, whose mesal face braces the aedeagus laterally. Subgenital plate connected dorsally to ventral angles of tenth tergites and forming the ventral support of the aedeagus, produced ventrally as a narrow, elongate, mesal sclerite extending into the basal part of the claspers where it articulates with a structure lying in the dorsomesal groove of the claspers. Lateral penis sheaths, small, semimembranous. Claspers elongate, generally fused or approximate mesoventrally, generally with a subapical spine or tooth on each side dorsally. Aedeagus with an elongate basal tube, constricted at midlength,

where it bears a complex structure which bears a pair of basally directed processes and a basal loop; apically with a large membranous sac which generally bears a pair of small spines.

**LARVA.**—Stem of frontoclypeal suture developed, arms mostly obsolete, tentorial pits rather indistinct. Anterior margin of frontoclypeus generally straight, rarely lobate; posterior portion and adjacent genae generally rugose. Pronotum divided longitudinally, anterolateral angles not produced. Femora with basodorsal setae spiniform. Abdomen with segments 5 and 6 abruptly enlarged, 7 slightly smaller. Abdomen with 9 tergites: first transverse, reaching onto side of segment; tergites 2–7 broad, widest mesally, without central pores, occupying only a small portion of each segment; eighth tergite larger, about 3 times as broad as long; ninth tergite shield shaped, rarely with some enlarged basal setae. Segment 1 without lateral sclerites, segments 2–7 with two, segment 8 with 1. Anal claw with dorsal seta either pale or black.

Although the antennae, number of ocelli, and dorsal structure of the head may vary greatly between the species, the general form of the male genitalia and

the larvae serve to unite the species herein placed. The species may be divided into two groups based on the presence of either two or three ocelli in the male. The first group, the *melleopicta* group, has 1 or 2 large areas of greenish (or whitish) setae on the forewings, and 3 ocelli in both sexes, the males possess a process from the seventh sternum, and, except in *chiriquiensis*, an unmodified head. To this group belong: *melleopicta* Mosely, *viridis* Flint, *limpia* Ross, *tubifex* Flint, *gomezi*, new species, and *chiriquiensis*, new species. The second, the *pictipes* group, has spots or linear greenish or whitish marks on the forewing, and in the male 2 ocelli, the head is generally modified (simple in *imitator*), a brush of setae from the seventh sternum (*fairchildi* has a point). To this group belong: *imitator*, new species, *sarita* Ross, *pictipes* (Banks), and *fairchildi*, new species.

The larvae are known for many species of the genus (unknown only in *melleopicta*, *viridis*, and *fairchildi*). There are observable differences between the larvae of all species, although the separation of *sarita* and *pictipes* is based on a comparative characteristic that is not altogether satisfactory.

### Key to Species of *Leucotrichia*

#### ADULTS

1. With 3 ocelli.....*melleopicta* group.....2  
    With 2 ocelli.....*pictipes* group.....7
2. Head with a pair of large internal pouches and a frontal shelf bearing flattened setae; basal antennal segment elongate.....*chiriquiensis*  
    Head without pouches; antennae simple.....3
3. Claspers in lateral aspect less than twice as long as broad; eighth sternum bilobed, margin with short, broad setae.....*tubifex*  
    Claspers at least twice as long as broad; eighth sternum either squarely truncate or deeply divided and without specialized setae.....4
4. Eighth sternum with posterior margin squarely truncate.....*gomezi*  
    Eighth sternum with posterior margin deeply divided on midline.....5
5. Aedeagus with basal loop attached to a pair of long rods.....*limpia*  
    Aedeagus either lacking basal loop, or loop attached directly to midlength complex.....6
6. Ninth segment longer than wide in ventral aspect, with ventral margin much more deeply indented than dorsal margin.....*viridis*  
    In ventral aspect, the ninth segment slightly wider than long, dorsal and ventral margins almost equally indented.....*melleopicta*
7. Head without modifications.....*imitator*  
    Head with specially sclerotized regions, flaps, and often with special setae.....8
8. Head with a longitudinally depressed, strongly sclerotized central area bordered by a setate area, but without special pouches or lobes; antennae simple.....*sarita*  
    Head with setate lobes and/or pouches; some antennal segments flattened.....9
9. Seventh sternum with a process.....*fairchildi*  
    Seventh sternum with a brush of setae only.....*pictipes*

## LARVAE

1. Anal claw with dorsal seta black and enlarged.....2  
Anal claw with dorsal seta pale and normal.....3
2. Head capsule without rugose or papillate regions.....*chiriquiensis*  
Head capsule with a conspicuous crescentic band of large rugosities between eyes.....*limpia*
3. Right mandible with a mesal tooth.....4  
Right mandible without a mesal tooth.....5
4. Frontoclypeus with a pair of submesal lobes on anterior margin and a reticulate area posteriorly.....*tubifex*  
Frontoclypeus barely sinuate anteriorly, no reticulate area.....*gomezi*
5. Head with a conspicuous pattern of pale and dark areas.....*imitator*  
Head nearly unicolorous.....6
6. Anterolateral seta of mesonotum and metanotum enlarged and generally darkened.....*sarita*  
Anterolateral seta small and pale.....*pictipes*

*Leucotrichia melleopicta* Mosely

FIGURES 2, 9, 10, 236

*Leucotrichia melleopicta* Mosely, 1934, p. 46; 1937, p. 151.—  
Ross, 1944, p. 120.—Fischer, 1961, p. 83.

This species is apparently quite closely related to *viridis*, but because the type abdomen is slightly crushed on a slide, it is impossible to be certain of its exact relationship. The ninth segment seems proportionately much broader and with both the dorsal and ventral margins almost equally indented in *melleopicta*, in addition the aedeagus, especially with its paired, long apical spines, seems very different.

ADULTS.—Length of forewing, 2 mm. Forewing with a central area of whitish hairs (possibly green when fresh). Ocelli 3; head dorsally wholly seta bearing, unmodified; antenna simple. Male genitalia: Seventh sternum with a long process, slightly enlarged apically. Eighth sternum with a deep V-shaped ventromesal excision, lateral angles with long setae. Ninth segment short, about as long as broad in ventral aspect; anterodorsal indentation about as deep as ventral; posterior margin ventrolaterally with a row of stout setae. A heavily sclerotized apicolateral plate, quadrate in ventral aspect; from basomesal angles giving rise to a plate with a large, circular, basal opening. Claspers indistinct, but apparently about twice as long as broad, fused mesally, with a strong dorsolateral seta. Aedeagus with a pair of strong, elongate apicomesal spines; a dorsal structure with a U-shaped apicomesal excision and deeply divided basomesally; subapically a collarlike ventral structure, laterally with a lightly sclerotized enlargement bearing basally a slender loop.

MATERIAL.—MEXICO: TABASCO: Teapa, March, H. H. Smith, ♂ holotype, BM (NH).

*Leucotrichia viridis* Flint

FIGURES 11–13, 236

*Leucotrichia viridis* Flint, 1967, p. 10.

This species seems to be most closely related to *melleopicta*, but to differ in a number of characteristics in the male. The proportionately longer and narrower ninth segment, which is much more deeply divided ventrally than dorsally, is a most noticeable difference; however, seeming differences exist in the structure of the aedeagus and the claspers as well.

ADULT.—Length of forewing, 3 mm. Color basically gray; antennae with a subapical series of pale segments, face and tegulae with green hairs, forewing green except for apex. Ocelli 3; head dorsally wholly seta bearing, unmodified; antenna simple. Male genitalia: Seventh sternum with a long, posteromesal process, spatulate in ventral aspect. Eighth sternum produced laterally, with a broadly U-shaped apicomesal excision. Ninth segment distinctly longer than broad in ventral aspect, with ventral surface much more deeply divided than dorsal; posterolateral margin bordered with a row of long setae. Subgenital plate narrow in ventral aspect, with an ovoid basal opening. Clasper long and slender, with a dorsal tooth at midlength. Aedeagus membranous at apex, with a pair of apicolateral points and a ventral scoop; midventral complex with a pair of basal rods; a simple basal tubular portion.

MATERIAL.—MEXICO: VERA CRUZ: Fortin de las Flores, 17 May 1964, Blanton et al., 4♂ 7♀. CHIAPAS: Soyalo, Route 195, km. 24, 10 Aug. 1967, O. S. Flint, Jr., 1 (without abdomen). GUATEMALA: IZABAL: Las Escobas, near Matias de Galvez, 14–16 Aug. 1965, Flint, Spangler, and Ortiz, ♂ holotype, ♀ allotype,

47♂ 4♀ paratypes. ESCUINTLA: Escuintla, 10 Aug. 1965, P. J. Spangler, 5♀. EL SALVADOR: SAN SALVADOR: Lago Ilopango, 5 Aug. 1967, O. S. Flint, Jr., 1♀. PANAMA: CHIRIQUI: David, Rovira, 2,200 feet, 13 July 1964, A. Broce, 1♂ 1♀.

***Leucotrichia limpia* Ross**

FIGURES 14–18, 49, 230, 236

*Leucotrichia limpia* Ross, 1944, p. 273.

Although this species is clearly a member of the *melleo-picta* group, it offers a number of distinctive characteristics. The coloration of the wings, grayish green with a transverse black band, is diagnostic, as is the small, pointed seventh sternal process. There are also smaller differences in the shape of the eighth sternum, claspers, and aedeagus.

ADULT.—Length of forewing, 3.5–4.5 mm. Legs and body straw colored; head and mesonotum with green hairs, with some fuscus hairs between; forewing mostly gray green with a transverse fuscus band at midlength, and apex fuscus. Ocelli 3, head dorsally seta bearing, simple; antenna simple. Male genitalia: Seventh sternum with a pointed apicomesal process, about one-fourth length of sternum. Eighth sternum with ventrolateral lobes, with a deep V-shaped apicomesal excision. Ninth segment as broad as long in ventral aspect, dorsal surface barely indented. Tenth tergite with inner margin tridentate; lateral penis sheath short and tubular. Subgenital plate U-shaped in lateral aspect, with dorsal arm subequal to ventral arm, with a small, ovoid basal opening in ventral aspect. Clasper fused mesoventrally, with a dorsolateral spine; slightly longer than wide. Aedeagus with a pair of apical spines in a membranous sac; midlength complex bearing a pair of elongate basal processes giving rise to a large basal loop.

LARVA.—Length to 5 mm. Head dark brown, pale around eyes; with a crescentic band of large papillate rugosities posteriorly on frontoclypeus; anterior margin of frontoclypeus slightly convex. Thoracic nota dark brown, muscle scars slightly paler; prosternum with a pair of linear sclerites. Abdominal tergites dark brown. Anal claw with a large dark dorsal seta.

CASE.—Length 5.5 mm. by 2.5 mm. Silken; oval, slightly domed with a circular opening at each end.

MATERIAL.—U.S.A.: ARIZONA: Coconino Co., West Fork, 16 miles southwest Flagstaff, 5 Aug. 1961,

R. W. Hodges, 1♀. MEXICO: SAN LUIS POTOSI: Rancho Quemado (4 miles south Tamazunchale), Route 85, km. 353, 4–6 Aug. 1966, O. S. Flint, Jr., 1♂. OAXACA: Tamazulapan, 7–8 June 1967, Flint and Ortiz, 1♂. CHIAPAS: El Chorreadero, south of Chiapa de Corzo, 11 Aug. 1967, O. S. Flint, Jr., 1♂ 2♀. COSTA RICA: CARTAGO: Ojo de Agua, Route 2, km. 75, 30 June 1967, Flint, Spangler, and Ortiz, many larvae, ♂ ♀ pupae. (Originally described from: U.S.A.: TEXAS: Fort Davis, Limpia Creek, 19 April 1939, H. H. and J. A. Ross).

***Leucotrichia chiriquiensis*, new species**

FIGURES 1, 24–28, 231, 237

This is the most highly specialized species of the *melleo-picta* group so far found. The greatly modified head of the male is unique among the species of this group. The long rods attaching the basal loop to the midlength complex of the aedeagus is very suggestive of *limpia*, but the lateral lobes of the eighth sternum, narrow claspers, and apparent coloration are more suggestive of *viridis*.

The species is only known from one collection of larvae and pharate males and females. It is thus impossible to give a precise indication of the length of the forewing and coloration.

ADULT.—Length of forewing, probably about 2 mm. Color apparently mostly fuscus; antenna with apical segment and 2 segments at three-fourths the length pale; forewing with basal region green, fuscus apically. Ocelli 3; head with a broad anterior shelf bearing short, black, flattened and contiguous setae (leaving polygonal bases when removed as in type), shelf giving rise to a pair of internal, circular pouches in head, also filled with similar setae; antenna with basal segment slightly flattened and greatly elongate, indented on anterior face with this groove filled with modified setae, remaining segments terete. Male genitalia: Seventh sternum with a long, spatulate apicomesal process. Eighth sternum with apicolateral angles produced into short rounded lobes. Ninth segment open ventrally, dorsally with anterior margin nearly straight; postero-ventral angle but slightly prolonged, with a row of long setae. Tenth tergites and lateral penis sheaths, typical. Subgenital plate typical, ventral arm longer than dorsal, with a small, ovoid basal opening. Claspers fused basally, in ventral aspect narrow with tips directed mesad, in lateral aspect with dorsal margin produced



into a tooth at midlength. Aedeagus with apex bearing a lightly sclerotized apical tubule and small, membranous lateral processes, midlength complex with long basal rods supporting basal loop.

**LARVA.**—Length to 3 mm. All sclerites blackish brown, pale around eyes; head without rugose areas, posterior portion of frontoclypeal region depressed; anterior margin of frontoclypeus truncate. Prosternum with a pair of elongate sclerites. Anal claw with dorsal seta enlarged and black.

**CASE.**—Length 4 mm. by 2 mm. Silken; oval in outline, slightly convex; anterior and posterior openings slightly rimmed.

**MATERIAL.**—Holotype, pharate male. PANAMA: CHIRIQUI: Alto Lino above Boquete, 16–17 July 1967, Flint and Ortiz. USNM Type 70896. Paratypes: Same data, 2♂ 1♀. Other: Same data, many larvae and pupae.

### *Leucotrichia tubifex* Flint

FIGURES 19–23, 42–46, 232, 237

*Leucotrichia tubifex* Flint, 1964, p. 44; 1968a, p. 33.

This species and *gomezi*, new species, form a distinctive subgroup in the *melleopicta* group. They are characterized by their large size, rather uniform olive or bronze green coloration, virtually identical structure of the aedeagus, and possession of a molar tooth on the right mandible of the larvae.

From *gomezi*, *tubifex* is most easily recognized by the comparatively shorter claspers and apex of the aedeagus, and specialized structure of the eighth sternum in the male. The larvae of *tubifex* are easily distinguished by the structure of the frontoclypeus with its submesal lobes from the anterior margin and its reticulate area posteriorly.

**ADULT.**—Length of forewing, 4–5 mm. Color of body and appendages, brownish black; hairs of head, thorax, and forewings, olive green. Ocelli 3; head dorsally wholly seta bearing; antenna simple. Male genitalia: Seventh sternum with a short, pointed, compressed apicomeral process. Eighth sternum posteriorly with a pair of rounded, submesal lobes each bearing a row of short, broad setae. Ninth segment about as high as long, anterolateral angle not produced; dorsally with anterior margin truncate; with a long row of stout setae posterolaterally. Tenth tergite with inner margin weakly tridentate; lateral penis sheath membranous and indistinct. Subgenital plate lightly

sclerotized, extending as a narrow band from ventral angles of tenth tergites, ventral margin of dorsal arm sinuate in profile, ventral arm shorter than dorsal. Clasper short and broad, slightly constricted subapically, without dorsal tooth. Aedeagus with an apico-ventral sclerite, a pair of short, basally directed rods at midlength, basal loop complete.

**LARVA.**—Length to 7 mm. Head yellow brown; posterior half of frontoclypeal region darkly reticulate, tentorial pits rather well marked; anterior margin of frontoclypeus with a pair of submesal lobes. Right mandible with a large mesal tooth. Thoracic nota yellowish marked with brown laterally and posteriorly, muscle scars indistinctly darker. Prosternum without longitudinal sclerites. Abdominal tergites pale brown. Dorsal seta of anal claw small and pale.

**CASE.**—Length to 7 mm. by 2–3 mm. Silken; elongate-oval, domed; anterior and posterior openings rimmed, and extended into tubes 1–2 mm. long at pupation.

**MATERIAL.**—PUERTO RICO: Maricao, light at fish hatchery, 23 Dec. 1962, Spangler, ♂ holotype; Rio Anasco, Route 109, km. 18, 11 Aug. 1961, Flint, Spangler, and Maldonado, ♀ allotype, 4♂ 4♀ paratypes, larvae and pupae; Rio Villalba above Guayabal Reservoir, 14 Aug. 1961, Flint and Spangler, 9 larvae; near San Lorenzo, Route 181, km. 9.1, Flint and Spangler, 1 larva, cases; Route 191, km. 29.3, 8 Jan. 1963, Spangler, 18 larvae. JAMAICA: ST. ANDREW: Yallahs River, Chestervale, 24–25 July 1962, O. and R. Flint, Farr, 2♂ 4♀, ♂ ♀ pupae, larvae; same, but 17 July 1963, Flint and Farr, 8♂ 2♀; Hope River near Newcastle at milepost 16.5, 30 July 1962, Farr, O. and R. Flint, 1 larva; same, but 18 July 1963, Flint and Farr, 1 ♂. DOMINICAN REPUBLIC: Jarabacoa, 3–4 June 1969, Flint and Gomez, 1 ♂; Rio Camu, 19 km. northeast of Jarabacoa, 12 June 1969, Flint and Gomez, many larvae and pupae.

### *Leucotrichia gomezi*, new species

FIGURES 222–226, 236

This species is related to the preceding, *tubifex* Flint, but differs in a number of ways both in the adult males and larvae. The eighth sternum of the male is almost squarely truncate and without specialized setae, the claspers are almost three times as long as broad, and the apical parts of the aedeagus are proportionately longer in *gomezi*.

The larvae of *gomezi* are quite different in appearance, lacking the submesal lobes of the anterior margin and reticulate region posteriorly on the frontoclypeus, but possessing a group of papillae mesad of the eyes.

**ADULT.**—Length of forewing, 4.5–6 mm. Body brownish black, legs yellowish brown; hairs of head, thorax, and wings bronze green. Ocelli 3; head dorsally wholly seta bearing; antennae simple. Male genitalia: Seventh sternum with a short, pointed apicomesal process. Eighth sternum with posterior margin straight. Ninth segment slightly longer than high, anterolateral angle not prolonged; dorsally with anterior margin straight; with a row of stout setae posterolaterally. Tenth tergite with posterior margin tridentate, dorsal point acutely produced; lateral penis sheath membranous. Subgenital plate extending from ventral angles of tenth tergites as a broad mesal plate into basal region of claspers and extending as a pointed structure within claspers. Clasper short, slightly less than three times as long as broad, slightly constricted subapically, with an apicodorsal seta. Aedeagus with an elongate apicoventral sclerite and usual midlength complex and basal loop.

**LARVA.**—Length to 7 mm. Head yellow brown, darker along anterior margin and posteriorly; several large papillae mesad of eyes, tentorial pits well marked; anterior margin of frontoclypeus slightly sinuate. Right mandible with a mesal tooth. Thoracic nota yellow brown, marked with fuscus marginally, muscle scars slightly darker; legs with tarsi distinctly darker than basal segments. Prosternum without linear sclerites. Abdominal tergites dark brown. Dorsal seta of anal claw small, pale.

**CASE.**—Length to 8 mm. by 3 mm. Silken; elongate-oval, slightly domed; anterior and posterior openings, circular, slightly rimmed, but not tubelike.

**MATERIAL.**—Holotype, male. DOMINICAN REPUBLIC: La Palma, 12 km. east of El Rio, 2–13 June 1969, Flint and Gomez. USNM Type 70897. Paratypes: Same data, 10 ♂ 5 ♀; Convento, 12 km. south of Constanza, 6–13 June 1969, Flint and Gomez, 2 ♀. Other: Same data as holotype, many larvae, ♂ ♀ pupae.

### *Leucotrichia imitator*, new species

FIGURES 3, 33–37, 233, 237

This species is the least modified of the *pictipes* group. The male genitalia of this species are very similar to

those of *L. sarita*; however, *L. imitator* is easily recognized by its unmodified head. The claspers of this species lack the small apicodorsal point found in *sarita*, and the aedeagus possesses a pair of eversible apical sacs and a pair of apicoventral, dark bands.

The larvae in the one collection available are easily distinguished from those of the other species by their distinctive color pattern on the head.

**ADULT.**—Length of forewing, 3–4 mm. Body brownish; antennae annulate, tarsi indistinctly annulate, head with green and fuscus hairs; forewing fuscus with crescentic greenish bands, whole wing with frosting of green hairs. Ocelli 2; head simple, setae concentrated along anterior and posterior margin; antenna simple. Male genitalia: Seventh sternum with an apicomesal brush of setae. Eighth sternum with a broad, shallow apical excision. Ninth segment with anterolateral angle slightly produced; posterolateral margin with a row of stout setae; dorsally with anterior margin slightly concave. Tenth tergite typical; lateral penis sheath small, indistinct. Subgenital plate connecting tenth tergites ventrally, extending ventrad as a narrow, straight process, ventral arm inflated basally. Clasper almost 4 times as long as broad in lateral aspect, with a dorsal spine subapically, apex rounded in lateral aspect. Aedeagus membranous apically with a pair of sacs bearing a sclerotized apex, subapically with a pair of lateral sclerites forming a pair of dark, elongate bars ventrally; with midlength complex, basal loop, and basal tube.

**LARVA.**—Length to 5 mm. Head brown, with a distinct pattern of pale spots centrally; posterior half of frontoclypeal region rugose, with tentorial pits rather well marked, anterior margin truncate. Thoracic nota yellowish marked with dark laterally and posteriorly. Abdominal tergites yellowish brown. Anal claw with dorsal setae small and pale.

**CASE.**—Length 5 mm. by 2.5 mm. Silken; oval in outline, domed; opening at one end provided with a large hoodlike flap, other opening simple.

**MATERIAL.**—Holotype, male. MEXICO: VERA CRUZ: Plan del Rio Ver, Route 140, km. 368, 23 July 1965, Flint and Ortiz. USNM Type 70898. Paratypes: Same data, 1 ♂ 1 ♀. GUATEMALA: EL PROGRESO: San Augustin Acasaguastlan, 11–21 Aug. 1965, Flint and Ortiz, 2 ♂ 1 ♀. SUCHITEPEQUEZ: Puente Ixtacapa, near San Antonio, 18–19 June 1966, Flint and Ortiz, 1 ♂. COSTA RICA: PUNTARENAS: Rio Seco, north-



west of Esparta, 23 July 1967, Flint, 2♂. Other: Same data, many larvae, ♂ ♀ pupae.

### *Leucotrichia sarita* Ross

FIGURES 4, 29–32, 48, 238

*Leucotrichia sarita* Ross, 1944, p. 274.—Flint, 1968b, p. 38.

In the modifications of the head, this species occupies an intermediate position between *imitator* and *pictipes*. In *sarita* the central portion of the head is concave and bordered laterally by a row of setae, the anterior area bears a dense brush of setae which lies in the central depression. The genitalia of this species and *fairchildi* appear to be indistinguishable; however, the head of the latter is very differently structured.

The larvae of *sarita* and *pictipes* are almost inseparable. The anterolateral seta of the mesonotum and metanotum is distinctly enlarged and generally darkened in *sarita*, whereas it is pale and hardly enlarged in *pictipes*.

**ADULT.**—Length of forewing, 3–4 mm. General color fuscus; bright green linear markings on the forewings, tegulae, and head; antenna with alternating series of white and fuscus segments. Ocelli 2; head centrally heavily sclerotized and concave, bounded laterally by a lightly sclerotized area bearing a linear cluster of setae, heavily sclerotized next to eye and bearing a slightly elevated ocellus, clypeal region densely hairy bearing a dorsal brush mostly covering dorsomesal sclerite; antenna simple. Male genitalia: Seventh sternum with an apicomesal brush of setae. Eighth sternum produced into acute lateral angles, posterior margin broadly U-shaped. Ninth segment strongly produced posteroventrally, anterior margin dorsally concave, with a row of strong setae posterolaterally. Tenth tergite typical; lateral penis sheath ovoid, lightly sclerotized. Subgenital plate extending as a narrow sclerite from ventral angle of tenth tergite, ventral arm elongate, inflated basally, pointed apically. Clasper in lateral aspect about 5 times as long as broad, with a dorsal subapical spine, apex produced into a small point dorsally. Aedeagus with a pair of apicolateral sclerites capping membranous lobes, subapically with several linear sclerites ventrally; midlength complex with a pair of basal rods, and a complete basal loop.

**LARVA.**—Length to 3.5 mm. Head yellow brown; posterior half of frontoclypeus coarsely rugose; anterior margin of frontoclypeus truncate. Thoracic nota yellow brown, darker laterally and posteriorly; anterolateral seta of mesonotum and metanotum enlarged and generally dark. Abdominal tergites brown. Dorsal seta of anal claw small and pale.

**CASE.**—Length to 4 mm. by 2.5 mm. Silken; oval in outline, slightly domed; with slightly rimmed anterior and posterior circular openings.

**Material.**—U.S.A.: TEXAS: Balmorhea, irrigation flume, 19 April 1939, H. H. and J. A. Ross, ♂ holotype, INHS; New Braunfels, Landa Park, 18 June 1960, Flint and Collette, larvae, ♂ pupa; Hays Co., Wimberly, Fern Bank Spring, 1 July 1960, O. S. Flint, Jr., 6 pupae; same, but 17 Sept. 1960, larvae, ♂ ♀ pupae. MEXICO: NUEVO LEON: Monterrey, Rio Elizondo, 19–20 June 1956, O. S. Flint, Jr., 1 larva, ♂ pupa. VERA CRUZ: Plan del Rio Ver, Route 140, km. 368, 23 July 1965, Flint and Ortiz, 2♂ 7♀; Fortin de las Flores, June 1964, F. S. Blanton, 1 ♂; Cuitlahuac, 10–12 Aug. 1964, P. J. Spangler, 2♂ 5♀; El Encero, Route 140, km. 347, 22 July 1965, Flint and Ortiz, 5♂; Rio Tacolapan, Route 180, km. 551, 25–26 July 1966, Flint and Ortiz, 1♂. MORELOS: near Xochitepec, Route 95, km. 91, 1 Aug. 1965, O. S. Flint, Jr., 9♂ 10♀; Xochitepec, 12–14 July 1965, Flint and Ortiz, 6♂ 5♀, larvae, ♂ ♀ pupae. MICHOACAN: San Lorenzo, Route 15, km. 206, 14–15 July 1966, Flint and Ortiz, 8♂ 5♀. OAXACA: Jaltepec, 21 May 1964, F. S. Blanton, 1♂; Tehauntepec, 23 July 1964, P. J. Spangler, 1♂ 7♀. CHIAPAS: east of Arriaga, Route 185, km. 135, 7–8 July 1966, Flint and Ortiz, larvae, ♂ ♀ pupae; near Pijijiapan, 5 July 1965, P. J. Spangler, 1♂; Puente Arroyo Viejo, near Mapastepec, 7 July 1966, Flint and Ortiz, 2 larvae, 1 pupa. GUATEMALA: SUCHITEPEQUEZ: Cuyotenango, 10–20 June 1966, Flint and Ortiz, 1♀, larvae, ♂ ♀ pupae. RETALHULEU: Puente El Nino, 16 June 1966, Flint and Ortiz, 1♀. SAN MARCOS: Puente Ixben, 15 June 1966, Flint and Ortiz, 3♂. EL SALVADOR: SANTA ANA: 2 miles north of Candelaria de la Frontera, 7 Aug. 1967, O. S. Flint, Jr., 1♂. COSTA RICA: GUANACASTE: Las Canas, 13 July 1965, P. J. Spangler, 4♂ 23♀. PUNTARENAS: Rio Seco, northwest of Esparta, 23 July 1967, O. S. Flint, Jr., 1♂. GRENADA: 2 miles west of Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., 6♂ 7♀, ♂ pupa.

***Leucotrichia pictipes* (Banks)**

FIGURES 5-6, 38-41, 47, 239

*Orthotrichia pictipes* Banks, 1911, p. 359.—Betten, 1934, p. 152.—Milne, 1936, p. 77.*Ithytrichia confusa* Morton.—Lloyd, 1915, p. 117.—Nielsen, 1948, p. 11 [misidentification].*Stactobia pictipes* (Banks).—Ross, 1938, p. 10.—Fischer, 1961, p. 110.*Leucotrichia pictipes* (Banks).—Ross, 1944, p. 120.—Denning, 1947a, p. 170; 1947b, p. 145.—Leonard and Leonard, 1949, p. 12.—Denning, 1956, p. 255.

This species and the following, *fairchildi*, have the most highly modified heads in the genus. The details of the structure of the heads in the two species, however, are quite different, the seventh sternum lacks the apicomesal point in *pictipes*, and there are many differences in the male genitalia between the two.

The larvae of *pictipes* resemble those of *sarita* very closely (larvae of *fairchildi* are unknown). The anterolateral seta of the mesonotum and metanotum of *pictipes* is not much enlarged and is pale, whereas the same seta in *sarita* is much enlarged and generally dark.

**ADULT.**—Length of forewing, 3-4 mm. Color reddish brown (old specimens); marked with white hairs on face and tegulae; antenna annulate beyond basal segments; tarsi indistinctly annulate; forewing with a white basal spot, a white transverse band at midlength, apex with a series of pale marginal spots. Ocelli 2; anteromesal part of head deeply depressed with a dark, hirsute, goblet-shaped structure, posterior warts large, bearing from beneath a large hirsute lobe, anterolateral lobes elongated anteromesally, partially open beneath, densely hirsute, clypeal region densely hirsute; antenna with basal segment globose, next five segments compressed, narrow, segments beyond progressively more elongate and terete. Male genitalia: Seventh sternum with an apicomesal brush of setae. Eighth sternum with a broad apicomesal excision. Ninth segment with a slight anterolateral lobe, dorsal margin anteriorly shallowly concave, with a short row of stout setae posterolaterally. Tenth tergite with mesal face tridentate; lateral penis sheath small, indistinct. Subgenital plate extending as a narrow sclerite from ventral angle of tenth tergite, ventral arm elongate, inflated basally, pointed apically. Clasper in lateral aspect about 3 times as long as broad, with a dorsal subapical spine, apex rounded. Aedeagus with a pair of apicolateral sclerites, subapically with a pair of caliperlike ventral sclerites,

midlength complex with basal rods and a complete basal loop.

**LARVA.**—Length to 4.5 mm. Head yellow brown; posterior half of frontoclypeus coarsely rugose, anterior margin of frontoclypeus truncate. Thoracic nota yellowish, posterior margins darker; anterolateral seta of mesonotum and metanotum pale, but slightly enlarged. First, eighth, and ninth abdominal tergites dark brown, other tergites pale brown.

**CASE.**—Length 5 mm. by 3 mm. Silken; oval in outline, slightly domed; circular openings at each end, each with a small rim.

**MATERIAL.**—U.S.A.: VIRGINIA: Fauquier Co., Broad Run, Thorofare Gap, 27 March 1962, O. S. Flint, Jr., many larvae. WEST VIRGINIA: Pendleton Co., Smoke Hole Camp, 28-29 Aug. 1963, R. and O. Flint, 2♂ 2♀. ILLINOIS: Apple River Canyon State Park, 6 June 1940, Mohr and Burks, 2♂ (INHS). MICHIGAN: Big Rapids, Muskegon River, 22 May 1936, Frison and Ross, 2♂ (INHS). WISCONSIN: Hayward, Chippewa River bridge, Moose Lake, 12 Aug. 1938, T. H. Frison and T. H. Frison, Jr., 1♂ (INHS). WYOMING: Yellowstone National Park, Madison Junction, 19 Aug. 1962, P. J. Spangler, 1♂. UTAH: Juab Co., Gandy, 6 May 1937, Rees, larvae, ♂ ♀ pupae. NEW MEXICO: Jemez Springs, 4 July 1953, W. W. Wirth, 1♂. ARIZONA: Cochise Co., Southwest Research Station, 4 miles west Portal, 5,400 feet, 29 July 1965, V. D. Roth, 1♂. OREGON: Klamath Lake, 27 July, Dyar and Caudell, 3♂ 2♀. NEVADA: Reno, 3 Aug. 1916, H. G. Dyar, many ♂ ♂ ♀ ♀. CALIFORNIA: Kern Co., Kern Canyon, 15 miles east Bakersfield, 6 Aug. 1964, R. L. Nelson, 4♂. Recorded from Colorado, Idaho, Minnesota, and New York (Johnstown, type locality).

***Leucotrichia fairchildi*, new species**

FIGURES 7-8, 238

This species shares with *pictipes* the distinction of having extreme modifications of the head and antennae. From *pictipes*, *fairchildi* differs in the type of modifications of the head, in the broader basal antennal segments, in the possession of an apicomesal point on the seventh sternum, and in many particulars in the male genitalia. From *sarita*, from which I find no differences in the male genitalia, *fairchildi* differs totally in the structure of the head, antennae, and seventh sternum.

**ADULT.**—Length of forewing, 2.5 mm. Color fuscus with green linear marks on forewing, and tegulae;

antenna with alternating series of light and dark segments. Ocelli 2; posterolateral wart large, with setiferous, membranous lobe protruding from beneath, with a pair of anterolateral pouches bearing specialized setae, anteromesally with a membranous, setiferous "tentacle"; antenna with basal segment slightly enlarged, basal flagellar segments very broad and thin, forming a concave cup, apical segments elongate and cylindrical. Male genitalia: Seventh sternum with a small apicomesal point. I am unable to find any other differences in the genitalia between this species and those of *sarita*, for which see drawings and descriptions.

**MATERIAL.**—Holotype, male. PANAMA: COCLE: El Valle, 17 Dec. 1929, G. Fairchild, MCZ collection.

### Genus *Costatrichia* Mosely

*Costatrichia* Mosely, 1937, p. 166. [Type species: *Costatrichia lodora* Mosely, 1937, by original designation.]

**ADULT.**—Ocelli 3. Spurs 1, 3, 4. Pronotum slightly elongate. Antenna with basal segment simple, sometimes with segments at midlength expanded. Mesoscutellum with transverse suture; metascutellum nearly triangular. Forewing often with reflexed costal cell. Male genitalia: Seventh sternum with an apicomesal pointed process. Eighth sternum produced posteroventrally, sometimes bearing processes. Ninth segment completely open ventrally, with a setose posterolateral process. Tenth tergite (?) heavily sclerotized, often united to ninth segment, forming a strong lateral brace to aedeagus. Lateral penis sheath generally large and ovoid, sometimes small and indistinct. Clasper elongate, generally divided into dorsal and ventral

branches, not fused to each other mesally. Aedeagus with a basal tubular section passing into a midlength complex which bears circular "windows" in lateral aspect and a large basal loop, apex with a membranous central tube with various combinations of spines and lateral plates.

**LARVA.**—Unknown.

*Costatrichia*, as here used, is not as tightly knit a group as are either *Leucotrichia* or *Zumatrichia*. It is clearly related to these genera, however, as is shown by the general structure of the aedeagus. Although in the form of the genitalia, *Costatrichia* approaches *Zumatrichia* most closely, it is easily separated from this genus by having three ocelli and unmodified basal antennal segments.

*Costatrichia simplex*, new species, and *C. spinifera*, new species, are clearly very closely related, and may be considered to form the *simplex* group. They are characterized by unmodified antennae and lack of a reflexed costal cell on the forewing together with a very similar form of the genitalia. The remaining species, *lodora* Mosely, *panamensis* Flint, *tripartita*, new species, and *bipartita*, new species, may be considered to form the second group, the *lodora* group. In these species some of the antennal segments are greatly broadened and the forewings possess a reflexed costal cell. In these species there is more variation in the form of the genitalia, although all possess more or less strongly divided claspers.

The immature stages of this genus are totally unknown. However, based on adult affinities, I would expect the larvae to have enlarged abdominal segments five to seven.

### Key to Species of *Costatrichia*

#### ADULTS

1. Forewing with a reflexed costal cell, antennae with a series of broad segments... *lodora* group... 2  
No reflexed costal cell, antennal segments terete... *simplex* group... 5
2. Clasper deeply divided into two or three arms, of which at least one is greatly elongated... 3  
Clasper only slightly divided with dorsal and ventral arms short and subequal in length... *lodora*
3. Clasper divided into three parts, all of which are greatly elongate... *tripartita*  
Clasper divided into two parts, dorsalmost being most elongate... 4
4. Eighth sternum with posterolateral angle bearing two short, broad and one long, slender setae;  
ventral arm of clasper small and directed distinctly ventrad... *bipartita*  
Eighth sternum without ornamentation; ventral arm of clasper larger, directed posteriad... *panamensis*
5. Eighth sternum bearing four broad setae laterally and a midventral flap... *spinifera*  
Eighth sternum without modifications from posterior margin... *simplex*

***Costatrichia lodora* Mosely**

Figures 55–61, 240

*Costatrichia lodora* Mosely, 1937, p. 168.—Fischer, 1961, p. 139.

This species is very closely related to *C. panamensis* Flint, differing in having the dorsal arm of the claspers only slightly longer than the ventral and in having long apicoventral rods in the aedeagus.

The specimen from Costa Rica differs slightly in a number of ways from the paratype studied, the most noticeable being the broader dorsal arm of the clasper. I believe, however, that both belong to the same species.

**ADULT.**—Length of forewing, 2.5 mm. Completely denuded; brown. Scape very long, slightly compressed, basal flagellar segments broad, concave anteriorly. Forewing with a reflexed costal cell basally. Male genitalia: Seventh sternum with a long, slender, pointed process. Eighth sternum produced posteroventrally, posterior margin with a slight mesal excision. Ninth segment with anterolateral angle produced into a rounded lobe; with a rounded, setose posterolateral process. Tenth tergite broadly fused to posterior margin of ninth segment, posterior margin shallowly concave. Lateral penis sheath broad basally, tapering apically in lateral aspect, broad and bilobed in ventral aspect. Clasper divided into a pointed, slightly curved dorsal arm slightly surpassing ventral arm which is produced into an apicomesal point. Aedeagus with typical basal tubular portion and midlength complex with basal loop; apically with a pair of long, lateroventral structures pointed apically and a membranous dorsal lobe with two sclerotized points.

**MATERIAL.**—MEXICO: CHIAPAS: Dolores, 16 Mar. 1931, A. Dampf, ♂ paratype, BM(NH). COSTA RICA: SAN JOSE: Rio General, Pacuare, 1 July 1967, P. J. Spangler, 1 ♂.

***Costatrichia panamensis* Flint**

Figures 62–65, 240

*Costatrichia panamensis* Flint, 1967, p. 11.

The species is probably most closely related to *C. bipartita*, new species, from which it differs in lacking the ornamentation of the eighth sternum, in the shape of the claspers and lateral penis sheath, and in the structure of the aedeagus.

**ADULT.**—Length of forewing, 2–2.5 mm. Color primarily fuscus, marked with bright green on mesonotum; forewing mostly green with conspicuous transverse fuscus bands just beyond midlength and at apex. Basal antennal segments compressed and very broad; densely covered with black setae. Forewing with an elongate, reflexed costal cell. Male genitalia: Seventh sternum with a long, pointed, apicomesal process. Eighth sternum slightly produced posteromesally, with a small apicomesal excision. Ninth segment produced anterolaterally as a narrow, rounded lobe; with a semi-erect, setose posterolateral process. Tenth tergite broadly united to ninth segment laterally, posterior margin shallowly concave. Lateral penis sheath broad and rounded apically in lateral aspect, apicoventral surface with a broadly V-shaped excision, with a narrow V-shaped strap dorsally. Clasper divided into an elongate, broad ventral arm, and a long pointed dorsal arm. Aedeagus with typical basal tubular portion and midlength complex with basal loop; apex with a dorso-mesal sclerite terminating in a ventral point, a membranous ventromesal process terminating in a spine, and a pair of basolateral plates.

**MATERIAL.**—PANAMA: CANAL ZONE: Rio Agua Salud, Pipeline Road, 30 Mar. 1965, S. S. and W. D. Duckworth, 1 ♂ holotype; same, but 8–12 July 1967, Flint and Ortiz, 7 ♂ 2 ♀; same, but July 1967, W. W. Wirth, 2 ♂ 2 ♀.

***Costatrichia bipartita*, new species**

Figures 66–69, 240

The bifurcate form of the claspers in this species indicates its close relationship to *C. panamensis* Flint, from which it is easily distinguished by the structure of the eighth sternum, and shape of the lateral penis sheaths, claspers, and aedeagus.

**ADULT.**—Length of forewing, 2.5 mm. Completely cleared; color unknown. Antenna with scape and basal flagellar segments slightly enlarged, about as broad as long. Forewing with a small reflexed costal cell opening ventrally. Male genitalia: Seventh sternum with a long, narrow process, slightly enlarged apically. Eighth sternum with a small lateral lobe, bearing 1 long, slender seta and 2 short, broad setae; posterior margin with a ragged, U-shaped mesal excision. Ninth segment with anterolateral angle broadly rounded, with a rounded, hirsute posterolateral process. Tenth tergite

narrow, pointed ventrally. Lateral penis sheath heavily sclerotized, narrowed and rounded apically, with a ventral subapical point. Clasper with a long curved, dorsal arm, ventral arm curved ventromesally, fused mesally and forming a small lobe in ventral aspect. Aedeagus with typical basal tubular portion, and midlength complex with basal loop; apical portion with a flat dorsal sclerite and a pair of heavily sclerotized spines.

**MATERIAL.**—Holotype, male. NICARAGUA: CHONTALES: Puente Quinama, near Villa Somoza, 29 July 1967, O. S. Flint, Jr. USNM Type 70899. Paratype: Same data, 1 ♂.

*Costatrichia tripartita*, new species

FIGURES 70–73, 237

This species, on the basis of the modifications of the antennae and forewings, falls in the *lodora* group, but the structure of the genitalia is very distinctive, especially the tripartite claspers and the large dorsomesal spine of the eighth sternum.

**ADULT.**—Length of forewing, 2.5 mm. Completely cleared; color unknown. Antenna with scape very large, basal flagellar segments broader than long, all covered with short, broad setae. Forewing with an elongate, reflexed costal cell. Male genitalia: Seventh sternum with an elongate, pointed, apicomesal process. Eighth sternum scooplike, posterior margin deeply and narrowly divided on midline; with a large pointed process arising just basad of division and directed dorsad and posteriad. Ninth segment with anterolateral angle truncate, posterolateral lobe rounded, multisetate. Tenth tergite heavily sclerotized, pointed apicoventrad, with a posterodorsal knob. Lateral penis sheath lightly sclerotized, short, with a distinct ventral plate. Clasper tripartite: a long, slightly curved, spinelike ventromesal process; a long, broad, ventrolateral process; a shorter, spinelike, dorsolateral process. Aedeagus with basal tubular portion, midlength complex with complete basal loop; apical portion with a lightly sclerotized dorsal plate, and a pair of large, heavily sclerotized ventral spines.

**MATERIAL.**—Holotype, male. PANAMA: CANAL ZONE: Rio Agua Salud, Pipeline Road, 8–12 July 1967, Flint and Ortiz. USNM Type 70900.

*Costatrichia spinifera*, new species

FIGURES 74–77, 238

This species seems to be rather closely related to *C. simplex*, new species, from which it is easily distinguished by the ornamentation of the eighth sternum, shape of the claspers, and aedeagus.

**ADULT.**—Length of forewing, 2 mm. Forewing mostly fuscus, basal half bearing many greenish white hairs, then an oblique fuscus region, subapical region with many greenish white hairs, tip dark; apparently without a reflexed costal cell. Antenna simple. Male genitalia: Seventh sternum with a long, slender, pointed apicomesal process. Eighth sternum elongate, apicolateral angle produced, bearing 4 short, stout setae, ventromesally with a small, thin, rectangular process. Ninth segment with anterolateral angle broad, posterolateral process, pointed, erect. Lateral penis sheath, broad, rounded apically, sides not fused mesoventrally. Clasper broadest basally, tapering apicad, tip pointed, directed mesad. Aedeagus with basal tubular portion, midlength complex with basal loop; apex membranous with a dorsobasal group of 3 contiguous spines, slightly more distad with 3 pairs of separated spines, apical membranous tube with a ventral region of spinules.

**MATERIAL.**—HOLOTYPE, male. PANAMA: CANAL ZONE: Rio Agua Salud, Pipeline Road, 8–12 July 1967, Flint and Ortiz. USNM Type 70901. Paratypes: Same data, 1 ♀. CHIRIQUI: Rio Caimito, 10 miles west of David, 4 July 1967. P. J. Spangler, 2 ♂.

*Costatrichia simplex*, new species

FIGURES 78–81, 240

This species is most closely related to the preceding one, *C. spinifera*, new species, from which it is easily distinguished by the shape of the eighth and ninth segments, claspers, and aedeagus.

**ADULT.**—Length of forewing, 2–2.5 mm. Forewing mostly brown, with a narrow transverse, green stripe at midlength, a mottled greenish region subapically, and with an interrupted greenish band along posterior margin; head with white hair; costal vein with a basal bulla. Antenna simple, pale. Male genitalia: Seventh sternum with two pointed mesal processes. Eighth sternum slightly elongate, without ornamentation, almost squarely truncate. Ninth segment elongate,



anterior margin obliquely truncate, posterolateral lobe rounded, multisetate. Tenth tergite broadly fused to ninth segment, connected dorsally by a distinctly sclerotized strap. Lateral penis sheath elongate, rounded apically, narrowly divided dorsally and ventrally. Clasper scoop-shaped, apicoventral angle slightly prolonged. Aedeagus with basal tubular section, midlength complex with basal loop; apex with a basal cluster of about 8 pairs of spines, then a slightly sclerotized dorsal hook, beneath which arises a membranous, generally recurved tube whose undersurface is covered with dark spicules.

**MATERIAL.**—Holotype, male. EL SALVADOR: SAN SALVADOR: Lake Ilopango, near Apulo, 4–5 July 1966, Flint and Ortiz. USNM Type 70902. Paratypes: Same data, 2♂ 3♀; same, but 5 Aug. 1967, many ♂♂ ♀♀. MEXICO: CHIAPAS: near Pijijiapan, 5 July 1965, P. J. Spangler, 7♂; Arriaga, 22 July 1965, P. J. Spangler, 2♂. HONDURAS: COMAYAGUA: Rio Humuya, northwest of Comayagua, 3 Aug. 1967, O. S. Flint, Jr., 1♂. ATLANTIDA: Lancetilla, Aug., Stadelmann, 3♂ (MCZ). VALLE: Nacaome, 4 Aug. 1967, O. S. Flint, Jr., 1♂. CHOLUTEC: Pespere, 1 Aug. 1967, O. S. Flint, Jr., 1♂. COSTA RICA: GUANACASTE: Rio Ahogados, 10 miles northwest of Liberia, 25 July 1965, P. J. Spangler, 1♂; Las Canas, 13 July 1965, P. J. Spangler, 1♂.

### *Anchitrichia*, new genus

**TYPE SPECIES.**—*Anchitrichia spangleri*, new species.

**ADULT.**—Ocelli 2 in ♂ and ♀. Spurs 1, 3, 4. Basal antennal segment simple. Pronotum elongate mesally; mesoscutellum with a transverse suture; metascutellum pentagonal. Forewing broad, not markedly attenuate apically; held rooflike over body in repose. Male genitalia: Seventh sternum with a pointed apicomeral process. Eighth sternum with 2 pairs of lateral processes. Ninth tergum quadrate laterally, open ventrally; a ventral sclerite (ninth sternum?) connecting claspers and eighth sternum. Cercus rounded with many setae. Tenth tergite trigonal, heavily sclerotized. Lateral penis sheath narrow, pointed. Claspers narrow, divided mesally. Aedeagus with midlength complex, basal loop, no apical spines.

**LARVA** (supposition).—Stem of frontoclypeal suture well developed, tentorial pits indicated faintly. Frontoclypeus with anterior margin bearing a pair of broad submesal lobes; posteromesally with a raised scalelike

process. Pronotum with anterolateral angles strongly produced over head; divided longitudinally. Femora with a large arborescent seta basodorsally. Abdomen with 9 tergites: first transverse, rounded laterally, tergites 2–7 broad mesally with paired central pores, eighth tergite with posterolateral angles produced, ninth tergite broader than long without enlarged basal setae. Segments 1 and 8 with a small lateral sclerite; segments 2–7 with 2 pairs of small sclerites. Anal claw lacking black apical seta. Abdominal segments increasing regularly in size through the seventh, ninth much reduced.

This genus is erected for a species that differs rather strongly from the species of *Zumatrixia*, to which it shows its greatest similarity. The species is very distinctive especially when alive: i.e., the large size, broader wings with transverse green markings, and manner of holding the wings rooflike over the abdomen. Structurally, the species is equally distinctive, especially noteworthy are the unmodified antennae, the presence of 2 ocelli in both males and females, and the general structure of the male genitalia.

The larvae attributed to this genus and species have not been reared, nor have metamorphotypes been taken. However, based on size, relationship, and occurrence, there is no other adult form to which they can be reasonably ascribed. These larvae are very distinctive, albeit clearly more closely related to those of *Zumatrixia* than to any other genus. Some of the more distinctive characteristics are the bilobed anterior margin and posteromesal process of the frontoclypeus, the enlarged anterior angle of the pronotum, the arborescent seta of the femora, and the shape and structure of the abdominal tergites.

### *Anchitrichia spangleri*, new species

FIGURES 82–89, 234, 241

This is the only known species of the genus. The male genitalia of this species show more variation than seen in other leucotrichine species, with both the shape of the clasper and the number of spines it bears being especially variable.

**ADULT.**—Length of forewing, 4–5 mm. Body and appendages straw colored; antennae weakly annulate; most tarsal segments bicolored, apex of hind tibia dark; head and thorax covered with greenish and a few fuscous hairs; forewing mostly fuscous with trans-

versely linear green marks and scattered green hairs. Head simple, posterior wart slightly enlarged. Antenna terete, basal segments nearly equidimensional, segments distinctly elongate toward apex. Male genitalia: Seventh sternum with a pointed apicomeral process about half as long as sternum. Eighth sternum bearing laterally two long, slender processes; dorsalmost longest and capped by a short, black seta, ventral process one-half to two-thirds the length of dorsal one. Ninth tergum rather short with anteroventral angle rounded and slightly produced; posterolateral lobe buttonlike, multi-setate. A broad, ventromesal sclerite connecting posterior margin of eighth sternum to clasper bases. Tenth tergite narrow, broadly fused to apicolateral margin of ninth tergum. Lateral penis sheath narrow and decurved in lateral aspect, not divided ventrally but completely open dorsally. Clasper elongate, narrow, slightly curved, dorsal margin with a group of 1-2 erect, dark, subapical setae, apex with 4-10 such setae. Aedeagus with basal tubular portion, midlength complex with large lateral "windows" and large basal loop, apex tubular without spines.

**LARVA.**—Length to 6 mm. Mandibles and labrum as in *Leucotrichia*. Head yellowish brown. Frontoclypeal region without rugosity, slightly depressed; with several papillae posteromesad of eyes. Thoracic nota pale brown; marked with fuscus; setae short, surface smooth. First abdominal tergite with a dark transverse stripe; other tergites pale brown.

**CASE.**—Larval case 8 mm. by 2 mm. Silken; open ventrally and both ends. One end protected by an enlarged, transversely oval hood; opposite end with a flared collar.

**Pupal case** 4-5 mm. by 1-1.5 mm. Torpedo shaped, made of tough silk. Attached from one end to substrate by a silk strand 2-8 mm. long (averaging 5-6 mm.).

**BIOLOGY.**—The larvae construct a rather typical case on large boulders in the strongest current just below the surface film. Just prior to pupation the silken thread is spun from the end with the flared collar to a small silken hold-fast attached to the boulder. The larval case is then apparently shortened, cut loose from the boulder, and transformed into the torpedo-like cocoon. This pupal case, which is attached at one end to the boulder by the silken thread, floats freely in the water just below the surface film. This adaptation may serve to prevent desiccation and death of the pupae caused by minor changes in the water level.

**MATERIAL.**—Holotype, male. MEXICO: CHIAPAS: Arriaga, 22 Aug. 1965, P. J. Spangler. USNM Type 70903. Paratypes: MEXICO: SAN LUIS POTOSI: Paltila, 5 June 1966, O. S. Flint, Jr., 12♂ 11♀. VERA CRUZ: Puente Nacional, 31 July 1966, Flint and Ortiz, 2♀; same, but 15 June 1964, F. S. Blanton, 1♂; Rio Tacolapan, Route 160, km. 551, 25-26 July 1966, Flint and Ortiz, 1♀; Cuitlahuac, 10-12 Aug. 1964, P. J. Spangler, 2♀. TABASCO: Rio Puyacatengo, east of Teapa, 28-29 July 1966, Flint and Ortiz, 5♂ 24♀. CHIAPAS: same data as holotype, 52♂ 64♀. GUATEMALA: SUCHITEPEQUEZ: Cuyotenango, 10-20 June 1966, Flint and Ortiz, 2♂ 2♀; Puente Ixtacapa, near San Antonio, 28 June 1966, Flint and Ortiz, 1♂ 25♀. ESCUINTLA: Escuintla, 10 Aug. 1965, P. J. Spangler, 5♂ 11♀. HONDURAS: COMAYAGUA: Rio Humuya, northwest of Comayagua, 3 Aug. 1967, O. S. Flint, Jr., 5♀. COSTA RICA: GUANACASTE: Quebrada Tronadorcita, Arenal, 24 July 1967, O. S. Flint, Jr., 1♂; Rio Ahogados, 10 miles northwest of Liberia, 25 July 1965, P. J. Spangler, 1♂; Rio Corobici, Las Canas, 26 July 1967, O. S. Flint, Jr., 1♀; Las Canas, 13 July 1965, P. J. Spangler, 1♂ 5♀. PUNTARENAS: Rio Seco, northwest of Esparta, 23 July 1967, O. S. Flint, Jr., 32♂ 13♀; 9 miles northwest of Esparta, 22 July 1965, P. J. Spangler, 1♂ 8♀; Rio La Vieja, near Laggarto, 2-3 July 1967, Flint and Ortiz, 1♀. CARTAGO: La Suiza, 17 June 1967, Flint and Ortiz, 3♀; Quebrada Relleno, La Cruzada, 20 June 1967, Flint and Ortiz, 1♀; 3 miles west of Turrialba, 18-21 June 1967, Flint and Ortiz, 1♂. SAN JOSE: Rio General, Pacuare, 1 July 1967, Flint and Ortiz, 7♂ 6♀. PANAMA: CHIRIQUI: Rio Caimito, 10 miles north of David, 4 July 1967, Flint and Ortiz, 3♀; Dolega, 17 July 1967, O. S. Flint, Jr., 4♂ 21♀; Rio Chiriqui Viejo, El Volcan, 5,280 feet, 22 July 1964, A. Broce, 1♀; Potrerillos, 3,200 feet, 25 July 1964, A. Broce, 1♂ 1♀; Rio El Pueblo, Dolega, 2,000 feet, 27 June 1964, A. Broce, 3♂ 7♀; David, Doleguita, 3 June 1964, A. Broce, 5♀; David, Rovira, 2,200 feet, 13 July 1964, A. Broce, 20♂ 19♀. CANAL ZONE: Rio Agua Salud, 8-12 July 1967, Flint and Ortiz, 1♂. Other: COSTA RICA: PUNTARENAS: Rio Seco, northwest of Esparta, 23 July 1967, O. S. Flint, Jr., 1 larva. SAN JOSE: Rio General, Pacuare, 1 July 1967, Flint and Spangler, many larvae and pupae.

### Genus *Zumatrichia* Mosely

*Zumatrichia* Mosely, 1937, p. 187.—Flint, 1968b, p. 34.

[Type species: *Zumatrichia filosa* Mosely, 1937, by original designation.]

**ADULT.**—Ocelli 2 in male, 3 in female. Spurs 1, 3, 4. Basal antennal segment of male elongate, enlarged, with a buttonlike appendage covering half of face which is slightly concave. Pronotum elongate mesally. Mesoscutellum with a transverse suture; metascutellum pentagonal. Forewing strongly attenuate. Male genitalia: Seventh sternum with an apicomeral pointed process. Eighth sternum well sclerotized and produced beneath ninth segment, often with processes. Ninth segment open ventrally, with a membranous tubular flap apicodorsally; posterolaterally with a lobe (cercus?) generally bearing one large apical seta. Tenth tergite (?) heavily sclerotized, produced and pointed ventrad, with a knoblike process dorsally. Lateral penis sheath (subgenital plate?) generally broad, lateral halves mostly fused ventromesally. Claspers generally fused basomesally, often with a long basodorsal process. Aedeagus with a basal tubular portion passing into a midlength complex which bears a basal loop and lateral "windows," apex with a membranous section often bearing lateral and dorsal plates and various internal spines.

**LARVA.**—Stem of frontoclypeal suture well developed, arms wanting; tentorial pits well marked. Anterior margin of frontoclypeus truncate, posterior portion rarely rugose. Pronotum divided longitudinally, anterolateral angles not produced; mesonotum and metanotum entire. Femora with basodorsal seta spiniform. Abdomen with segments 5 and 6 abruptly enlarged, 7 slightly smaller; with 9 tergites, first transverse, extending across dorsum of segment, second slightly smaller, third through seventh smaller yet; tergites 2–7 with a pair of contiguous central pores; eighth tergite larger, about 3 times as wide as long, with large black setae along posterior margin; ninth tergite shield shaped, with a crescentic band of short, stout setae along anterior and lateral margins. Segment 1 without lateral sclerites; segments 2 and 8 with 1 small lateral sclerite, segments 3–7 with 2 sclerites. Anal claw with dorsal seta pale and small.

In spite of the number of species included in the genus, they are all, with the exception of *Z. anomaloptera* Flint, identical in appearance in the field, and the general structure of the male genitalia is likewise the same in all species.

On both adult and larval structure the genus is clearly in the *Leucotrichia* series of genera. It appears to be most closely related to *Anchitrichia* from which it may be separated by the structure of the head and antennae, shape of the wings, and to a lesser degree by the structure of the genitalia. The larvae also support the same relationship to *Anchitrichia*, but differ in the shape of the pronotum and the structure of the dorsal seta of the femur.

*Zumatrichia multiseta*, new species, which I place in its own group, is the only species yet found in which the posterolateral lobe of the ninth segment is multiseta. This may represent the primitive condition in the genus, all of the remaining species having only one seta on this lobe. These remaining species seem to fall into several groups, one, the *galtena* group, lacks processes from the eighth sternum but possesses a basodorsal process from the clasper. This group contains twelve species: *echinata* Flint, *antilliensis* Flint, *saluda*, new species, *galtena* Mosely, *vieja*, new species, *notosa* (Ross), *strobilina*, new species, *chiriquiensis*, new species, *angulata*, new species, *bifida*, new species, *diamphidia*, new species, and *attenuata*, new species.

The other main group, the *filosa* group, bears a lateral process from the eighth sternum but lacks the long basodorsal process of the clasper. To this group I assign *filosa* Mosely, *caudifera*, new species, *teapa*, new species, and *rhamphoides*, new species. The group containing only *palmaria* possesses both a lateral process and a ventromesal lobe from the eighth sternum and a basodorsal process from the clasper. The last group, containing only *anomaloptera*, has genitalia much like the latter, but is distinct from all other species on the structure and coloration of the forewing.

Larvae have been associated with only three species in this genus. The larvae of *multiseta* differ from those of *antilliensis* and *anomaloptera* (between which I can find no differences) in the possession of a rugose area posteriorly on the frontoclypeus. I have also a few unassociated larvae from the mainland which are indistinguishable from those of the insular species. It thus seems quite probable that the larvae of the majority of the species will prove to be indistinguishable.



Key to Species of *Zumatrachia*

## ADULTS

1. Posterolateral lobe of ninth segment broad and bearing many setae ..... *multisetosa*  
Posterolateral lobe of ninth segment slender and bearing 1 or rarely 2 apical setae ..... 2
2. Eighth sternum without processes ..... 3  
Eighth sternum bearing processes of some sort ..... 14
3. Claspers in ventral aspect produced into rodlike apicolateral lobes ..... 4  
Claspers in ventral aspect truncate or conical (produced mesally) ..... 8
4. Basodorsal process of clasper simple, sinuous, attenuate ..... 5  
Basodorsal process of clasper bearing spines or distinctly enlarged subapically ..... 6
5. Aedeagus bearing apically 1 dorsal and 2 lateral spines ..... *echinata*  
Aedeagus bearing additionally a pair of hooked ventral spines ..... *antilliensis*
6. Basodorsal process of clasper widened apically, tip cleft ..... *saluda*  
Basodorsal process of clasper not enlarged apically, but with spines, etc. .... 7
7. Basodorsal process of clasper ending in a cluster of long spines ..... *galtona*  
Basodorsal process of clasper with a row of short spines apically and a mesal spine at midlength ..... *vieja*
8. Claspers in ventral view conical (produced apicomesally) ..... 9  
Claspers in ventral view truncate apically ..... 11
9. Basodorsal process of clasper a simple spinelike process ..... *notosa*  
Basodorsal process of clasper variously ornamented apically ..... 10
10. Basodorsal process of clasper strongly twisted and bearing a dorsolateral row of spines subapically, tip prolonged ..... *strobilina*  
Basodorsal process of clasper slightly sinuous, bearing a subapical cluster of dorsomesal spines, tip not prolonged ..... *chiriquiensis*
11. Basodorsal process of clasper a simple, angulate, pointed process ..... *angulata*  
Basodorsal process of clasper divided or bearing a basal process ..... 12
12. Basodorsal process of clasper divided into 2 subequal, simple processes ..... *bifida*  
Basodorsal process of clasper with a slender basal process ..... 13
13. Basodorsal process of clasper with apex widened and sharply angulate dorsad ..... *diamphidia*  
Basodorsal process of clasper long and attenuate ..... *attenuata*
14. Eighth sternum with a lateral process bearing an apical, enlarged seta ..... 15  
Lateral process without an enlarged apical seta ..... 18
15. Eighth sternum also produced ventromesally ..... 16  
Eighth sternum concave ventromesally ..... 17
16. Clasper with a long, pointed, basodorsal process; ventromesal lobe of eighth sternum truncate. .... *palmaria*  
Clasper with a short, seta-tipped basodorsal process; ventromesal lobes of eighth sternum caliperlike ..... *anomalopectera*
17. Aedeagus apically with a middorsal hood, 2 pairs of spines, and a midventral crooked rod. .... *filosa*  
Aedeagus with a middorsal hood, 1 pair of spines, and a pair of ventral pointed processes. .... *caudifera*
18. Clasper in lateral view, very long, enlarged subapically ..... *teapa*  
Clasper long, narrow, apex developed into a short, dorsal point ..... *rhamphoides*

*Zumatrachia multisetosa*, new species

FIGURES 90-93, 235, 242

This widely distributed species is easily recognized by the broad posterolateral lobe of the ninth segment which bears 5 to 10 elongate setae. The shape of the claspers is also rather distinctive as is the structure of the apical portion of the aedeagus.

This is one of the few species in the genus for which

the immature stages are known. As pointed out previously, this is the only species in which the posterior of the frontoclypeus is rugose. Of course this characteristic may not prove to be specifically distinctive when the larvae of more species are known.

ADULT.—Length of forewing, 3 mm. Color fuscus marked with patches of greenish hairs. Male genitalia: Eighth sternum with posterolateral margin obliquely truncate. Ninth segment with anterolateral

angle slightly produced and truncate; posterolateral lobe broad and bearing 5–10 stout setae. Lateral penis sheath broad, with a prominent ventral, subapical point. Clasper with a long, slender, apicolateral process, sometimes with its tip slightly bifid; midventrally fused and slightly produced. Aedeagus apically with a middorsal hoodlike process with its tip produced ventrally, beneath which are a pair of elongate spines, basoventrally with a pair of short, broad slightly bifid spines.

**LARVA.**—Length to 4 mm. Head brown; posterior half of frontoclypeal region rugose. Thoracic nota brown, points of articulation and margins darker. Abdominal tergites brown.

**CASE.**—Length 4 mm. by 2 mm. Silken with many imbedded sand grains; oval, slightly domed; circular openings at both ends, each rimmed with silk.

**MATERIAL.**—Holotype, male. **GUATEMALA:** SUCHITEPEQUEZ: Cuyotenango 10–20 June 1966, Flint and Ortiz. USNM Type 70904. Paratypes: **MEXICO:** VERA CRUZ: La Gloria Cardel, May 1937, J. Carmelo G., 1 ♂; Puente Nacional, 15 June 1964, F. S. Blanton, 2 ♂. **CHIAPAS:** near Pijijiapan, 5 July 1965, P. J. Spangler, 1 ♂; Arriaga, 22 Aug. 1965, P. J. Spangler, 7 ♂. **GUATEMALA:** SUCHITEPEQUEZ: same data as holotype, 9 ♂; Puente Ixtacapa, near San Antonio, 28 June 1968, Flint and Ortiz, 2 ♂. **ESCUINTLA:** Escuintla, Grutas de San Pedro Martir, 10 Aug. 1965, P. J. Spangler, 5 ♂. **HONDURAS:** ATLANTIDA: Lancetilla, Aug., Stadelmann, 9 ♂ (MCZ). **COSTA RICA:** GUANACASTE: Rio Ahogados, 10 miles northwest of Liberia, 25 July 1965, P. J. Spangler, 3 ♂; Rio Corobici, Las Canas, 26 July 1967, O. S. Flint, Jr., 2 ♂; Las Canas, 13 July 1965, P. J. Spangler, 12 ♂. **PUNTARENAS:** 9 miles northwest of Esparta, 22 July 1965, P. J. Spangler, 57 ♂; Rio Seco, northwest of Esparta, 23 July 1967, O. S. Flint, Jr., 84 ♂. Other: Same data, larvae, ♂ ♀ pupae.

### *Zumatrixia echinata* Flint

FIGURES 94–96, 243

*Zumatrixia echinata* Flint, 1967, p. 11.

This species is very closely related to *Z. antillensis* Flint from the Lesser Antilles. It differs in possessing shorter, broader apicolateral lobes on the claspers, and above all in the different arrangement of spines in the apical portion of the aedeagus.

**ADULT.**—Length of forewing, 3–3.5 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum without processes, truncate apically, with a small ventromesal cleft. Ninth segment with anterolateral angle slightly produced; posterolateral lobe slender, bearing a single seta. Lateral penis sheath ovate, nearly 3 times as long as broad, with a midventral tooth. Clasper with a long, slender, basodorsal process, sinuate apically; ventral lobe in ventral aspect with a short, broad, apicolateral process. Aedeagus apically with well-developed lateral plates, a single thin, narrow, dorsal process, and a pair of long internal spines.

**MATERIAL.**—**GUATEMALA:** EL PROGRESO: San Agustin Acasaguastlan, 11–21 Aug. 1965, Flint and Ortiz, 1 ♂ 1 ♀, holotype and allotype. **HONDURAS:** ATLANTIDA: Lancetilla, Aug., Stadelmann, 1 ♂ (MCZ).

### *Zumatrixia antillensis* Flint

FIGURES 50–54, 97–100, 228, 242

*Zumatrixia antillensis* Flint, 1968b, p. 34.

This species, which is often very abundant on the Lesser Antillean islands, is very similar to the preceding species, *Z. echinata* Flint. From this species it differs in having more slender apicolateral lobes of the clasper and in the structure of the apical portion of the aedeagus.

**ADULT.**—Length of forewing, 3–3.5 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum without processes, rather broad, divided ventromesally. Ninth segment with anterolateral angle produced into a narrow lobe; posterolateral lobe slender with a single apical seta. Lateral penis sheath elongate, ovoid, about 1½ times as long as broad, with a midventral tooth. Clasper with a long, slender, slightly sinuate, basodorsal process; ventral lobe elongate, with digitate apicolateral lobes. Aedeagus apically with a middorsal process widened basally, a pair of lateral spines, and an appressed, hooked, pair of midventral processes.

**LARVA.**—Length to 3 mm. Head brown; without rugosity, tentorial pits rather well marked. Thoracic nota and legs, brown, points of articulation and posterior margins of nota darker. Abdominal tergites brown.

**CASE.**—Length 4 mm. by 1.5 mm. Silken; oval in

outline, slightly domed; with circular anterior and posterior openings.

**MATERIAL.**—DOMINICA: Clarke Hall, 17 April 1964, O. S. Flint, Jr., ♂ holotype; plus many thousands of other specimens in all stages from all over the island. GUADELOUPE: Petit-Bourg, Duclos, March 1966, J. Bonfils, many ♂♂ ♀♀. ST. LUCIA: Cul de Sac River, at milepost 9, 29 July 1963, Flint and Cadet, 5♂; Vergallier River, near Marquis, 2 Aug. 1963, Flint and Cadet, 2♂. GRENADA: 2 miles west Grand Etang, 4–8 Aug. 1963; O. S. Flint, Jr., many ♂♂ ♀♀; Balthazar, 7 Aug. 1963, O. S. Flint, Jr., 4♂.

### *Zumatrichia galtena* Mosely

FIGURES 101–104, 243

*Zumatrichia galtena* Mosely, 1937, p. 188.—Fischer, 1961, p. 176.

This species is rather common and widespread over much of Mexico and Central America. It is closest to *Z. saluda*, new species, from which it differs in possessing a cluster of fingerlike appendages at the apex of the basodorsal processes of the clasper, and in having short ventral and long lateral spines in the apex of the aedeagus.

**ADULT.**—Length of forewing, 2.5–3.5 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum without processes; with a narrow midventral cleft. Ninth segment with anterolateral angle slightly developed; posterolateral process slender with a single apical seta. Lateral penis sheath large, rounded, slightly more than twice as long as broad, with a midventral tooth. Clasper with a long, slightly sinuate basodorsal process ending in a cluster of 4–5 fingerlike processes; ventral lobe bearing slender apicolateral processes. Aedeagus with rounded lateral plates, a slender middorsal process sheltering a pair of long, slender spines, a slightly curved, shorter, midventral spine, basally with a large number of small, internal spines.

**MATERIAL.**—MEXICO: VERA CRUZ: La Gloria Cardel, Jan. 1938, J. Camelo G., 5♂. CHIAPAS: Puente Arroyo Viejo, Route 200, km. 141, 9 June 1967, Flint and Ortiz, 2♂. HONDURAS: COMAYAGUA: Rio Humuya, northwest of Comayagua, 3 Aug. 1967, O. S. Flint, Jr., 65♂. COSTA RICA: GUANACASTE: Las Canas, 13 July 1965, P. J. Spangler, 2♂;

Rio Corobici, Las Canas, 26 July 1967, O. S. Flint, Jr., 21♂; Rio Ahogados, 10 miles northwest of Liberia, 25 July 1965, P. J. Spangler, 3♂.

### *Zumatrichia saluda*, new species

FIGURES 105–108, 243

This species is quite close to the preceding, *Z. galtena* Mosely, but differs in the shape of the apex of the basodorsal process of the clasper, and in possessing a pair of longer spines midventrally in the apex of the aedeagus.

**ADULT.**—Length of forewing, 3–3.5 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum without processes; truncate apically, with a narrow midventral cleft. Ninth segment with anterolateral angle broadly enlarged; posterolateral process slender with a single, long apical seta. Lateral penis sheath broad, rounded, about 1½ times as long as broad; with a midventral tooth. Clasper with basodorsal process long, slightly sinuous, subapically enlarged and cupped, with a shallow apical division (paratypes vary from none to many); ventral lobe with apicolateral, fingerlike processes. Aedeagus apically with basolateral plates, an elongate middorsal process, surmounting a pair of long spines, a pair of shorter spines centrally, a pair of long spines ventrally, basally with a large number of small, internal spines.

**MATERIAL.**—Holotype, male. PANAMA: CANAL ZONE: Pipeline Road, Rio Agua Salud, 8–12 July 1967, Flint and Ortiz. USNM Type 70905. Paratypes: Same data, 8♂. CHIRIQUI: David, Doleguita, 3 June 1964, A. Broce, 3♂.

### *Zumatrichia vieja*, new species

FIGURES 109–112, 242

Although this species is clearly a member of the *galtena* group, it is quite distinctive. The very long, slightly fimbriate basodorsal process of the clasper with its mesal tooth and the angulate spines of the aedeagus are distinctive.

**ADULT.**—Length of forewing, 3 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum without processes, rounded laterally, with a midventral cleft. Ninth segment with anterolateral angle enlarged and prolonged; posterolateral process slender, tipped by a long, slender seta.

Lateral penis sheath broad, rounded, slightly more than  $1\frac{1}{2}$  times as long as broad, with a midventral tooth. Clasper with a long, slender, basodorsal process, tip slightly fimbriate, with a mesal tooth near mid-length, process bowed outwardly beyond this tooth; ventral lobe with long, fingerlike apicolateral lobe. Aedeagus apically with a rounded basolateral plate, a slender, angulate middorsal process, a pair of long, angulate lateral spines, basally with a large number of small, internal spines.

**MATERIAL.**—Holotype, male. COSTA RICA: PUNTARENAS: Rio La Vieja, near Lagarto, east of Palmar Norte, 2–3 July 1967, Flint and Ortiz. USNM Type 70906. Paratypes: Same data, 7 ♂; Palmar Sur, 21 Aug. 1965, R. T. Allen, 3 ♂ (INHS); same, but 23 Aug. 1965, 6 ♂ (INHS). SAN JOSE: Rio General, Pacuare, 1 July 1967, Flint, Ortiz and Spangler, 1 ♂.

*Zumatrichia chiriquiensis*, new species

FIGURES 113–116, 244

This species is clearly related to the following, *Z. strobilina*, new species, from which it is distinguished by the different shape and spination of the basodorsal process of the clasper, the broader lateral penis sheaths, and the very different structure of the aedeagus.

**ADULT.**—Length of forewing, 3.5–4 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum without processes; posterior margin, with a U-shaped posteromesal excision. Ninth segment with anterolateral angle slightly produced and obliquely truncate; posterolateral lobe slender, with a single long seta. Lateral penis sheath broad and rounded, about  $1\frac{1}{2}$  times as long as broad; with a midventral tooth; in ventral aspect with apical portion bisinuate. Clasper with basodorsal process elongate, slightly sinuate, with several spinelike teeth apicomeresally; ventral lobe in lateral aspect with tip produced into a dorsal hook, in ventral aspect with posterior margin broadly conical. Aedeagus apically with a pair of lateral plates, a middorsal rod angled apically, and a pair of large, curved ventral spines.

**MATERIAL.**—Holotype, male. PANAMA: CHIRIQUI: Dolega, 17 July 1967, O. S. Flint, Jr. USNM Type 70907. Paratypes: Same data, 4 ♂; Rio El Pueblo, Dolega, 2,000 feet, 27 June 1964, A. Broce, 17 ♂; Doleguita, David, 3 June 1964, A. Broce, 20 ♂; Rovira, David, 2,200 feet, 13 July 1964, A. Broce, 3 ♂; Rio Chiriqui Viejo, El Volcan, 5,280 feet, 22 July 1964,

A. Broce, 1 ♂. COSTA RICA: SAN JOSE: Rio General, Pacuare, 1 July 1967, Flint, Ortiz, and Spangler, 8 ♂.

*Zumatrichia strobilina*, new species

FIGURES 117–120, 243

This species is closely related to the preceding from which it differs in the twisted, spiniferous basodorsal process of the clasper, the narrower lateral penis sheaths, and in the spines of the aedeagus.

**ADULT.**—Length of forewing, 4 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum without processes; with a deep, broad apicomeresal excision. Ninth segment with antero-lateral angle broadly rounded; posterolateral lobe slender, bearing a large, apical seta. Lateral penis sheath elongate, narrow, rounded, about 4 times as long as broad, with a ventral tooth slightly beyond mid-length; in ventral aspect with apical portion sinuate. Clasper with a heavy, twisted, basodorsal process bearing spiniform teeth on apical portion; ventral lobe in lateral aspect with a strong, subapical, dorsal hook, in ventral aspect with posterior margin broadly conical. Aedeagus apically with lateral plates united dorsally and prolonged into a spiniform process, a pair of long spines dorsally, and a pair of short spines ventrally.

**MATERIAL.**—Holotype, male. COSTA RICA: CARTAGO: 3 miles west of Turrialba, 18–21 June 1967, Flint and Ortiz. USNM Type 70908. Paratype: Same data, 1 ♂.

*Zumatrichia notosa* (Ross), new combination

FIGURES 121–124, 239

*Leucotrichia notosa* Ross, 1944, p. 271.

This species is clearly a member of the *galtena* group, but occupies a rather intermediate position between the two preceding species with conical posterior margins of the claspers, and the following four with truncate posterior margins of the claspers. The simple, curved, basodorsal process and the slightly conical posterior margin of the claspers, the rather short lateral penis sheaths, and the structure of the apical portion of the aedeagus are distinctive.

This species is the only one of the genus known from the United States and it is still only known from the few types.

**ADULT.**—Length of forewing, 3 mm. Coloration unknown. Male genitalia: Eighth sternum without processes, truncate apically, with an apicomesal cleft. Ninth segment with anterolateral angle not produced; posterolateral lobe slender and bearing a single seta. Lateral penis sheath barely longer than high; with a broad, subapical tooth ventrally. Clasper with basodorsal process slender, and curved, extending no further than lateral penis sheaths; ventral lobe in ventral aspect with posterior margin slightly produced mesally. Aedeagus apically with a well-developed dorsolateral hood produced into an apicomesal point, beyond which extends a pair of long, decurved central spines, an appressed pair of long ventral spines, basally with a large number of small, internal spines.

**MATERIAL.**—U.S.A.: MONTANA: Missouri River, Toston, 22 June 1940, H. H. and J. A. Ross, ♂ holotype, INHS.

*Zumatrichia angulata*, new species

FIGURES 125–128, 242

This species bears a simple basodorsal process from the claspers much like that of the preceding species, however, the shape of the ventral lobe of the claspers, and structure of the aedeagus point to a closer relationship with *Z. bifida*, new species. The simple, angulate basodorsal process of the claspers and the presence of two pairs of long spines in the aedeagus will serve to distinguish these two species.

**ADULT.**—Length of forewing, 4 mm. Coloration appearing typical (in alcohol). Male genitalia: Eighth sternum without processes; with a very small apico-ventral emargination. Ninth segment with anterolateral angle broadly enlarged; posterolateral process slender, with a single long apical seta. Lateral penis sheath short; apex nearly truncate, with a broad ventral tooth. Clasper with basodorsal process no longer than lateral penis sheath, simple, with apical half angled ventrad; ventral lobe with posterior margin almost squarely truncate in ventral aspect. Aedeagus with a middorsal rod, widened basolaterally, with 2 pairs of long spines, ventralmost slightly longer.

**MATERIAL.**—Holotype, male. PANAMA: CHIRIQUI: Rovira, David, 2,200 feet, 13 July 1964, A. Broce. USNM Type 70909. Paratype: Same, but Rio Chiriqui Viejo, El Volcan, 5,280 feet, 22 July 1964, A. Broce, 1 ♂.

*Zumatrichia bifida*, new species

FIGURES 129–132, 245

Although abundantly distinct, this species shows a definite relationship to *Z. angulata*, new species. The deeply divided basodorsal process of the claspers and the lack of long spines in the aedeagus are distinctive.

**ADULT.**—Length of forewing, 3–4 mm. Color apparently typical (in alcohol). Male genitalia: Eighth sternum without processes; with a small U-shaped apicomesal excision. Ninth segment with anterolateral angle broadly enlarged; posterolateral lobe slender, with a single, long, apical seta. Lateral penis sheath broad, rounded, about twice as long as broad, with a ventral tooth beyond midlength; irregularly constricted in ventral view. Clasper with basodorsal process elongate, divided for more than half its length; ventral lobe truncate in both its lateral and ventral aspects. Aedeagus apically with a middorsal rod, widened basolaterally, with a pair of short, subdorsal spines.

**MATERIAL.**—Holotype, male. COSTA RICA: SAN JOSE: Rio General, Pacuare, 1 July 1967, Flint, Ortiz, and Spangler. USNM Type 70910. Paratypes: Same data, 45 ♂. PANAMA: CHIRIQUI: Rovira, David, 2,200 feet, 13 July 1964, A. Broce, 2 ♂; Potrerillos, 3,200 feet, 25 July 1964, A. Broce, 1 ♂.

*Zumatrichia diamphidia*, new species

FIGURES 133–136, 244

The basodorsal process of the clasper in this species is one of the most bizarre of any yet seen in the genus. It is clearly related to the following species on the basis of the trifid clasper with a truncate ventral lobe, but is easily recognized by the very broad apex of the basodorsal process of the clasper which is angled sharply dorsad.

**ADULT.**—Length of forewing, 2.5 mm. Color apparently typical (in alcohol). Male genitalia: Eighth sternum without processes; posterior margin with a shallow mesal excision. Ninth segment with anterolateral angle broadly inflated; posterolateral lobe slender, with a single long, apical seta. Lateral penis sheath slightly narrowed and rounded apicad, slightly more than twice as long as broad; with a subapical ventral tooth; irregularly constricted in ventral aspect. Clasper with basodorsal process strongly sinuate basally, apex very broad, angled dorsomesad, tip bifurcate; with a slender process between basodorsal process and ventral



lobe; ventral lobe slightly angled in lateral aspect, with tip produced into a dorsal point, in ventral aspect almost squarely truncate. Aedeagus apically with a middorsal process upturned apically, 2 pairs of spines centrally, one much longer than other, with a heavy hooked midventral process.

**MATERIAL.**—Holotype, male. COSTA RICA: PUNTARENAS: 2.8 miles east of Golfito, 3–4 July 1967, Flint and Ortiz. USNM Type 70911. Paratype: Same, but 18–19 July 1967, 1 ♂.

### *Zumatrixia attenuata*, new species

FIGURES 137–140, 244

Although this and the preceding species are the only ones yet found with tripartite claspers, they are abundantly distinct. The shape of the basodorsal process of the claspers, lateral penis sheaths, and aedeagus are all diagnostic.

**ADULT.**—Length of forewing, 4 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum without processes; posterior margin with a shallow mesal excision. Ninth segment with anterolateral angle strongly produced; posterolateral lobe slightly broadened, with 2 long, apical setae. Lateral penis sheath elongate, about 3 times as long as broad, narrowed and rounded apically; with a midventral tooth; irregularly constricted in ventral aspect. Clasper with basodorsal process sharply angled basally and again at midlength, with a slender dorsal process from basal section, apex very long and slender; with a slender process between basodorsal process and ventral lobe; ventral lobe short with an apicodorsal point, truncate in ventral aspect. Aedeagus apically with well-developed basolateral sheaths united dorsally, slender middorsal process with several small, basal, spinous processes, and a single, large central spine.

**MATERIAL.**—Holotype, male. COSTA RICA: CARTAGO: Quebrada Relleno, La Cruzada, east of Turrialba, 20 June 1967, Flint and Ortiz. USNM Type 70912.

### *Zumatrixia palmara*, new species

FIGURES 141–144, 245

This undescribed species, although distantly related to *Z. anomaloptera* Flint, is extremely distinctive. The shape of the process from the lateral margin and the

midventral lobe of the eighth sternum, the long basodorsal process of the claspers, the structure of the apex of the aedeagus, and the lack of modification of the forewings will serve to characterize this species.

**ADULT.**—Length of forewing, 2.5–3 mm. Coloration typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum with an elongate dorso-lateral process which bears an apical, stout, angled seta; midventrally produced into a broad nearly truncate lobe. Ninth segment with anterolateral angle, broadly produced; posterolateral lobe slender, with a single large apical seta. Lateral penis sheath, narrowed and truncate apically, slightly longer than broad; constricted subapically in ventral aspect. Clasper with a straight, slender basodorsal process, ventral lobe elongate, slightly inflated apicad, halves widely separated in ventral aspect. Aedeagus with short, pointed basolateral plates, a long, tongue-like middorsal process, and a pair of long, slender, ventromesal spines which bear a basolateral scale-like process.

**MATERIAL.**—Holotype, male. EL SALVADOR: LA LIBERTAD: Rio El Palmar, 15 miles north of La Libertad, 2–3 July 1966, Flint and Ortiz. USNM Type 70913. Paratypes: Same data, 1 ♂. COSTA RICA: PUNTARENAS: 9 miles northwest of Esparta, 22 July 1965, P. J. Spangler, 4 ♂; Rio Seco, northwest of Esparta, 23 July 1967, O. S. Flint, Jr., 4 ♂; Palmar Sur, 21 Aug. 1965, R. T. Allen, 28 ♂ (INHS); Same, but 23 Aug. 1965, many ♂ ♂ ♀ ♀ (INHS).

### *Zumatrixia anomaloptera* Flint

FIGURES 145–148, 244

*Zumatrixia anomaloptera* Flint, 1968b, p. 37.

This species, recently described from the Lesser Antilles, shows some relationship to the preceding, especially in the structure of the eighth sternum. However, it is abundantly distinct in the shape of the claspers and aedeagus, and especially in the modifications of the forewing.

**ADULT.**—Length of forewing, 3 mm. Color brown; basal half of forewing of male covered by erect, scale-like, dark brown setae. Male genitalia: Eighth sternum with a short, posterolateral protuberance bearing an enlarged seta, ventrally with a pair of broad, caliper-like lobes. Ninth segment with anterolateral angle

broadly enlarged; posterolateral lobe slender, with a single, enlarged apical seta. Lateral penis sheath broad, rounded, about  $1\frac{1}{2}$  times as long as broad; with a ventral, subapical tooth. Clasper with basodorsal process very short, straight; ventral lobe nearly truncate apically. Aedeagus apically containing many spines.

**LARVA.**—Length to 3 mm. Sclerites pale brown. Head without rugosities; tentorial pits rather well marked. Thoracic nota and legs yellowish brown, darker at points of articulation and on posterior margins of nota. Abdominal tergites pale brown.

**CASE.**—Length 4 mm. by 1.5 mm. Silken; oval in outline, slightly domed, with anterior and posterior circular openings.

**MATERIAL.**—GRENADA: Balthazar, 7 Aug. 1963, O. S. Flint, Jr., ♂ holotype, allotype ♀, paratypes ♂♂ ♀♀, larvae, and pupae. ST. LUCIA: Riviere Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 1 ♂; Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, ♂♂ ♀♀; same, but 2 Aug. 1963, 2 ♂ 4 ♀. DOMINICA: Clarke Hall, 1–10 March 1965, W. W. Wirth, 1 ♂.

### *Zumatrixia filosa* Mosely

FIGURES 149–152, 245

*Zumatrixia filosa* Mosely, 1937, p. 187.—Fischer, 1961, p. 176.

This, the type species of the genus, is clearly related to the following, but has differently shaped lateral penis sheaths, claspers and apical spines in the aedeagus.

**ADULT.**—Length of forewing, 2.5–3 mm. Coloration, typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum with a long, slender, curved lateral process bearing a long, apical seta; posteroventral margin evenly concave. Ninth segment with anterolateral angle narrowly prolonged; posterolateral lobe, small, with an apical seta. Lateral penis sheath short, broad, rounded apically, nearly equidimensional, with an apicoventral tooth. Clasper with basodorsal process reduced to a small knob bearing a few small setae; ventral lobe rather broad and rounded apically, in ventral aspect with a U-shaped apical excision. Aedeagus apically with an elongated, middorsal hood, small basolateral sheaths, 4 long, internal spines, and a midventral rod, upturned apically.

**MATERIAL.**—MEXICO: VERA CRUZ: Puente Nacional, 31 July 1966, Flint and Ortiz, 1 ♂; Rio Tacolapan, Route 180, km. 551, 25–26 July 1966, Flint and Ortiz, 26 ♂. TABASCO: Rio Puyacatengo, east of Teapa, 28–29 July 1966, Flint and Ortiz, 2 ♂. GUATEMALA: SUCHITEPEQUEZ: Cuyotenango, 10–20 June 1966, Flint and Ortiz, 6 ♂. NICARAGUA: CHONTALES: Puente Quinama, east of Villa Somoza, 29 July 1967, O. S. Flint, Jr., 2 ♂. COSTA RICA: GUANACASTE: Quebrada Tronadorcita, Arenal, 24 July 1967, O. S. Flint, Jr., 1 ♂.

### *Zumatrixia caudifera*, new species

FIGURES 153–156, 246

This species, which is very closely related to *Z. filosa* Mosely, appears to replace it in southern Central America. It is quickly recognized by the pointed apices of the lateral penis sheaths, the dorsal, subapical point of the claspers, and the rather different appearance of the apical portion of the aedeagus.

**ADULT.**—Length of forewing, 2.5–3 mm. Coloration, typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum with a long, slender, lateral process, tipped by a long, stout seta; posteroventral margin concave. Ninth segment with anterolateral angle narrowly produced; posterolateral lobe small, tipped by a single seta. Lateral penis sheath with apex oblique, with apicoventral angle beaklike. Clasper with basodorsal process very short, with a small apical seta; ventral lobe in lateral aspect narrowed apicad with a dorsal subapical point, in ventral aspect rounded with a small apical excision. Aedeagus apically with a mid-dorsal hoodlike structure pointed apically, a pair of central spines, one generally more exerted than other, with a midventral attenuate structure terminating in a tightly appressed paired section.

**MATERIAL.**—Holotype, male. PANAMA: CHIRIQUI: Dolega, 17 July 1967, O. S. Flint, Jr. USNM Type 70914. Paratypes: Same data, 31 ♂; Rovira, David, 2,200 feet. 13 July 1964, A. Broce, 5 ♂; Doleguita, David, 3 June 1964, A. Broce, 12 ♂; Rio El Pueblo, Dolega, 2,000 feet, 27 June 1964, A. Broce, 25 ♂; Potrerillos, 3,200 feet, 25 July 1964, A. Broce, 1 ♂. COSTA RICA: SAN JOSE: Rio General, Pacuare, 1 July 1967, Flint, Ortiz, and Spangler, 10 ♂.

*Zumatrixia teapa*, new species

FIGURES 157–160, 246

This species is a member of the *filosa* group, and is most closely related to the following species, *Z. rhamphoides*, new species. It is easily recognized by the very long lateral process of the eighth sternum, long claspers, and long, pointed lateral penis sheaths.

**ADULT.**—Length of forewing, 2.5–3 mm. Coloration, typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum with a long, slender lateral process whose tip is shallowly divided; posteroventral margin straight. Ninth segment with anterolateral angle produced; posterolateral lobe short and broad, with a single, large apical seta. Lateral penis sheath with an oval basodorsal sclerite; sheath elongate, narrowed apically, with a long, pointed, apicoventral tooth. Clasper with a small, knoblike basodorsal process; ventral lobe, very long, and slender, slightly inflated apically, with a deep, narrow, midventral slit. Aedeagus apically with middorsal process pointed and decurved apically, expanded basally into lateral plates, internally with 6 spines of intermediate length.

**MATERIAL.**—Holotype, male. MEXICO: TABASCO: Rio Puyacatengo, east of Teapa, 28–29 July 1966, Flint and Ortiz. USNM Type 70915. Paratypes: Same data, 9♂.

*Zumatrixia rhamphoides*, new species

FIGURES 161–164, 247

This species is also a member of the *filosa* group, most closely related to the last described species. It differs in possessing a multidentate apex to the lateral process of the eighth sternum, a shorter and broader lateral penis sheath, and a very differently structured clasper and aedeagus.

**ADULT.**—Length of forewing, 2.5–3 mm. Coloration, typical pattern of grayish green and fuscus. Male genitalia: Eighth sternum with a slender lateral process whose tip is multidentate; posteroventral margin nearly straight. Ninth segment with anterolateral angle produced; posterolateral lobe, short, slender, tipped by a single seta. Lateral penis sheath about as broad basally as long ventrally, obliquely truncate, with apicoventral angle beaklike; basodorsally with a lateral, knoblike projection. Clasper without basodorsal process; ventral lobe slender, elongate, with apex produced into a dorsal point; in ventral aspect conical. Aedeagus

with a middorsal hook, pointed apically, expanded basolaterally to form lightly sclerotized lateral plates, with a pair of large central spines, basoventrally with a single, large short spine.

**MATERIAL.**—Holotype, male. COSTA RICA: PUNTARENAS: Rio La Vieja, near Lagarto, 23 July 1967, Flint and Ortiz. USNM Type 70916. Paratypes: Same data, 15♂; Rio Seco, northwest of Esparta, 23 July 1967, O. S. Flint, Jr., 9♂; 9 miles northwest of Esparta, 22 July 1965, P. J. Spangler, 8♂. SAN JOSE: Rio General, Pacuare, 1 July 1967, Flint, Ortiz and Spangler, 8♂. PANAMA: CHIRIQUI: Rio Caimito, 10 miles west of David, 4 July 1967, P. J. Spangler, 1♂.

*Genus Alisotrichia* Flint

*Alisotrichia* Flint, 1964, p. 46; 1968a, p. 34; 1968b, p. 39.  
[Type species: *Alisotrichia hirudopsis* Flint, 1964, by original designation.]

**ADULT.**—Ocelli 2 or 3 in male and female. Basal antennal segment of male often enlarged and covering half of face. Spurs 0, 2, 4, 0, 2, 3, or 0, 3, 4. Pronotum with anterior surface sclerotized and slightly produced dorsally. Mesoscutellum generally with a transverse suture, rarely obsolete or very obscure; metascutellum nearly triangular, with lateral angles slightly truncate. Wings very narrow and attenuate. Male genitalia: Extremely complex and often modified beyond certain homology. Eighth sternum often with a process from posterior margin. Ninth segment open ventrally, anterolateral angle often prolonged. Clasper various, often impossible to recognize as such, as are lateral penis sheaths, subgenital plate, tenth tergite, etc. Aedeagus generally simple, often constricted near midlength and with simple to complex internal structure, but never with basal loop, midlength complex with lateral “windows,” etc. Female genitalia: Seventh tergum with various modifications. Eighth and ninth segments simple, with anterolateral rods. Bursa copulatrix a simple internal ring or sphere.

**LARVA.**—Stem of frontoclypeal suture variously developed, arms partially or wholly lacking; tentorial pit poorly developed. Head without rugosity or other modifications. Pronotum divided longitudinally (only partially so in species 3), mesonotum and metanotum entire (divided in *A. argentinea*). Thoracic nota, legs, and abdominal tergites with modified setae, these are enlarged, comparatively short, generally truncate



and dark. Abdomen tapering rather gradually posteriorly, no segments greatly expanded; with 8 or 9 tergites, tergites 1-8 covering most of dorsum of each segment, each with a central dark area generally with 3 contiguous pores, anterolateral angle of each segment with a small setiferous sclerite; ninth tergite shield shaped without pores. Anal prolegs long, extending posteriorly; claw with enlarged apicodorsal seta.

The genus is difficult to define without finding an exception in one species or another. There are two characters, however, which seem to define the genus in the adult stage at this time: lack of a tibial spur on the foreleg, and lack of midlength complex on the aedeagus. In addition, the female genitalia has the

dorsum of the seventh segment modified and a very simple bursa, rather than the large, complex bursa of the other genera. The larvae of those species known are very distinctive: the middle abdominal segments are not enlarged and they bear distinctive enlarged setae.

It is possible to recognize several groups of species based on adult characters such as number of ocelli, spurs, and modification of the antennae. There are also several types of larvae to be observed, but too few of them have been correlated with the adult stage. However, when adults and larvae are correlated for more species, it may become clear that *Alisotrichia* should be divided into several genera or subgenera.

### Key to Species of *Alisotrichia*

#### ADULTS

1. Midleg with a preapical spur .....2  
Midleg lacking a preapical spur .....4
2. Claspers (?) fused into a single, median rodlike structure .....*septempunctata*  
Claspers paired, not rodlike .....3
3. With a long, mesal process extending ventrad from tenth tergum (?) .....*dominicensis*  
Without such a structure .....*wirthi*
4. Basal antennal segment terete; 3 ocelli .....5  
Basal antennal segment enlarged and flattened; with 2 ocelli or third ocellus reduced .....7
5. Clasper (?) sharply decurved apically .....6  
Clasper extending almost directly posteriorly .....*trifida*
6. Aedeagus with 5 small, curved, internal spines in addition to a central structure .....*blantoni*  
Aedeagus with a pair of long, lateral spines and a central structure .....*tamaza*
7. Eighth sternum with posterior margin bearing a spine or other process .....8  
Eighth sternum without any type of process .....11
8. Posterolateral margin of eighth sternum bearing 3 processes .....*argentinaea*  
Eighth sternum differently ornamented .....9
9. Posterolateral margin of eighth sternum bearing a decurved hook .....*hirudopsis*  
Eighth sternum differently ornamented .....10
10. Posterolateral margin of eighth sternum with a seta bearing knob, and a mesally directed process .....*orophila*  
With a dorsolateral lobe and a pair of mesoventral spines .....*lobata*
11. Genitalia with an elongate and well-developed lateral penis sheath .....*chorra*  
Lateral penis sheath reduced to a small, knoblike structure .....*quemada*

#### LARVAE

1. Abdomen with 8 tergites (including 9th) .....2  
Abdomen with 9 tergites .....3
2. Mesonotum and metanotum divided longitudinally .....*argentinaea*  
Mesonotum and metanotum entire .....*hirudopsis*
3. Enlarged setae broad, pointed; dorsal seta of femur feathered .....species 2  
Enlarged setae, narrower, truncate; dorsal seta of femur simple .....4
4. Abdominal tergites 2-7 with clearly defined pores .....5  
Tergites with dark marks, but without pores .....species 3
5. Tergites with the pores surrounded by dark mark .....*orophila*  
Tergites with pores in front of dark mark .....species 1

*Alisotrichia hirudopsis* Flint

FIGURES 165–168, 210–215, 229, 247

*Alisotrichia hirudopsis* Flint, 1964, p. 47.

This, the type species of the genus, is very distinctive. It is perhaps closest to the Jamaican *A. argenteilinea* Flint, but is easily recognized by the very different processes from the eighth sternum.

**ADULT.**—Length of forewing, 2 mm. Color black; with silver white hair dorsally on head and antennae, transversely on metanotum, and in spots of forewing. Male genitalia: Seventh sternum with a small, pointed process. Eighth sternum produced into apicolateral processes, terminating in a black, decurved hook. Ninth segment heavily sclerotized marginally, bearing a long anterolateral process, apically produced into a bulbous structure with a middorsal thickening, extending freely apically. Tenth tergites flattened, elongate plates. Aedeagus conical basally, tubular at midlength, membranous and apparently enlarged apically.

**LARVA.**—Length to 2.5 mm. Sclerites pale brown. Pronotum divided longitudinally, mesonotum and metanotum entire; mesonotal and metanotal tergites surrounded by small sclerotized points. Legs extending laterad in plane of body; coxae and femora with dorsal combs of setae. Enlarged setae of thoracic nota, legs, and abdominal tergites, dark, short, and truncate. Abdomen (excluding anal prolegs) subequal in length to thorax,  $1\frac{1}{2}$  times as long as width of widest segment. Abdomen with 8 tergites, 5 or 6 anteriormost with posterior sclerotized points; tergites 1–8 with a large central opening composed of 3 small pores; anterolateral sclerites large. Anal claw with large, black apicodorsal seta.

**MATERIAL.**—PUERTO RICO: El Yunque, stream at km. 6.4, Route 191, 16 Aug. 1961, Flint and Spangler, ♂ holotype, ♀ allotype, 103♂ 32♀ paratypes, larvae, and pupae; same, but 31 Dec. 1962, P. J. Spangler, 232♂ 15♀ paratypes; Rio de Bayamon, Route 156, km. 15.5, 19 Aug. 1961, Flint and Spangler, 2♂ paratypes; Yauco-Lares Road, km. 29, 20 Jan. 1954, Maldonado and Medina, 4♂ paratypes; Maricao Fish Hatchery, 23 Dec. 1962, P. J. Spangler, 1♀ paratype.

*Alisotrichia argenteilinea* Flint

FIGURES 169–171, 216–217, 246

*Alisotrichia argenteilinea* Flint, 1968a, p. 34.

This is another extremely distinctive species, belonging to the typical section of the genus. The lateral spines of the eighth sternum and odd structures of the tenth tergum are distinctive.

**ADULT.**—Length of forewing, 2.5 mm. Color brown; antennae, head, and mesonotum dorsally with silvery hair; forewing with a longitudinally silvery band ending in a transverse line, apex white. Ocelli 2 ♂ and ♀. Basal antennal segment greatly enlarged and covering face. Spurs 0, 2, 4. Male genitalia: Seventh sternum with a short apicomeres process. Eighth sternum with 3 lateral processes, dorsalmost terminating in a heavy spine, ventral one curved mesad; posterior margin with enlarged setae submesally. Ninth segment mostly rodlike, with long anterolateral projections, posteriorly with slender dorsolateral processes, and a basal plate sclerotized marginally. Tenth tergum consisting of a pair of dorsal, elongate plates slightly enlarged apically. Aedeagus tubular, conical basally, enlarged and indistinct within tenth tergum, ending in a tubule.

**LARVA.**—Length to 2.5 mm. Sclerites pale brown. All thoracic nota divided longitudinally; mesonotal and metanotal tergites surrounded by small sclerotized points. Legs extending laterad in plane of body; coxae and femora with dorsal combs of setae. Enlarged setae of thoracic nota, legs, and abdominal tergites short, dark and truncate. Abdomen (excluding anal prolegs) subequal in length to thorax, about twice as long as width of widest segment. Abdomen with 8 tergites, anterior 5 or 6 bordered posteriorly with small sclerotized points; tergites 1–8 each with a rectangular anteromesal excision, central opening composed of 3 small pores; anterolateral sclerites large. Anal claw with large, black apicodorsal seta.

**MATERIAL.**—JAMAICA: ST. ANDREW: Yallahs River, Chestervale, 17 July 1963, Flint and Farr, ♂ holotype, ♀ allotype, 1♂ paratype; same, but 24–25 July 1962, 8♂ 6♀ paratypes, larvae, and pupae; Hope River, near Newcastle, at milepost 16.5, 30 July 1962, Flint and Farr, 1♂ paratype; same, but 18 July 1963, 6♂ paratypes.

*Alisotrichia orophila* Flint

FIGURES 172-174, 218, 245

*Alisotrichia orophila* Flint, 1968b, p. 41.

Considering the head and appendages, this species belongs to the typical group, but is very distinctive in the male genitalia. The bifurcate process from the lateral margin of the eighth sternum and general simplicity of the remainder of the genitalia are diagnostic.

**ADULT.**—Length of forewing, 1.2 mm. Color grayish; forewing with bands of silvery hair. Ocelli 2 ♂ and 3 ♀. Basal antennal segment enlarged and covering face. Spurs 0, 2, 4. Male genitalia: No sternal processes. Eighth sternum bearing a long spine dorsolaterally; apicolaterally with a process ending in a mesally curving, furcate hook. Ninth segment with a very long, slender anterolateral process and a dorsomesal sclerite. Tenth tergum with a pair of dorsal straplike sclerites and a membranous apical lobe. Aedeagus tubular, base conical.

**LARVA.**—Length to 1.5 mm. Sclerites straw colored. Pronotum divided longitudinally; mesonotum and metanotum entire; mesonotum and metanotum without apparent sclerotized points. Legs extending laterally in plane of body; coxae and femora with dorsal combs of setae. Enlarged setae of thoracic nota, legs, and abdominal tergites short, dark, and truncate. Abdomen (excluding anal prolegs) slightly longer than thorax, slightly more than twice as long as width of widest segment. Abdomen with 9 tergites; antermost closely associated with metanotum, with anterolateral sclerite; tergite 1 with a small central darkening, but no pores, tergites 2-8 with a dark mark surrounding a central opening composed of 3 indistinct pores, without posterior sclerotized points; anterolateral sclerites large. Anal claw with an enlarged apicodorsal seta.

**MATERIAL.**—DOMINICA: d'Leau Gommier, 15 Feb. 1965, W. W. Wirth, ♂ holotype; same, but 27 April 1964, O. S. Flint, Jr., 1 larva, 2 pupae, 1 ♂ 1 ♀ metamorphotypes; 2.5 miles east of Pont Casse, 16 Jan. 1965, W. W. Wirth, ♀ allotype; 4 miles east of Pont Casse, 6 May 1964, O. S. Flint, Jr., 1 ♂ paratype.

*Alisotrichia lobata* Flint

FIGURES 175-177, 246

*Alisotrichia lobata* Flint, 1968b, p. 43.

This species appears to belong to the typical group of *Alisotrichia*, although it is not closely related to any other known species. The shape of the eighth sternum and the long spine and shape of the ventromesal complex of the ninth segment are distinctive.

**ADULT.**—Length of forewing, 1.5 mm. Color grayish; forewing with alternating bands of silvery and fuscous hairs. Ocelli 2 ♂, 3 ♀. Basal antennal segment enlarged and covering face. Spurs 0, 2, 4. Male genitalia: Seventh sternum with an apicomesal process. Eighth segment with a large, rounded anterolateral lobe, ventromesal angles prolonged into sharp spines separated by a narrow mesal excision. Ninth segment with long, very slender, anterolateral processes. Tenth tergum with a pair of dorsal straplike sclerites, with ventrolateral margin sclerotized. Ventrolateral angle of ninth segment with a long, slender process; ventromesally with a ring surrounded by a hoodlike structure. Aedeagus tubular, base slightly enlarged.

**MATERIAL.**—DOMINICA: Clarke Hall, malaise trap, 11-20 Jan. 1965, W. W. Wirth, ♂ holotype; same, but Cocoa Trail, 18 Jan. 1965, ♀ allotype, 2 ♀ paratypes; Fond Figue, 3 Feb. 1965, W. W. Wirth, 1 ♂ paratype.

*Alisotrichia chorra*, new species

FIGURES 178-181, 247

This species is perhaps the most distinctive of the continental species found to date, and the most like the insular species. The elongate genital capsule, large tenth tergum, and especially the structure of the aedeagus are very distinctive.

**ADULT.**—Length of forewing, 2 mm. Color unknown; completely cleared and in alcohol. Basal antennal segment enlarged, platelike, covering face. Ocelli 2. Spurs 0, 2, 4. Male genitalia: No sternal process. Eighth sternum elongate, with small, rounded, ventrolateral lobes. Ninth segment elongate, with slender anterolateral processes, posterior margin deeply divided middorsally, and with a pair of long, slender sclerites lying within division; posterolateral margin bearing a large decurved hook; apicoventrally with a small rounded process. Tenth tergum broad in

lateral aspect, rather bell shaped, open dorsally. Aedeagus sharply constricted subbasally, tubular beyond, lateral processes terminating in a heavy, hooked structure; centrally with a more lightly sclerotized structure bearing a pair of winglike lateral processes.

**MATERIAL.**—Holotype, male. MEXICO: CHIAPAS: El Chorreadero, 6.4 miles south of Chiapa de Corzo, 11 Aug. 1967, O. S. Flint, Jr. USNM Type 70917.

*Alisotrichia quemada*, new species

FIGURES 182–185, 248

This species is apparently a member of the typical group, although transitional in that the third ocellus is still present. The combination of platelike basal antennal segments and presence of the third ocellus are unique. The genitalia are also distinctive, especially the aedeagus with its long internal spine.

**ADULT.**—Length of forewing, 1.5 mm. Color fuscus, nearly immaculate. Basal antennal segment enlarged and nearly covering face. Ocelli 3; anteromesal ocellus sunken and slightly reduced in size. Spurs 0, 2, 3. Male genitalia: Seventh sternum with a small, rounded apicomesal process. Eighth sternum with posterolateral angles produced into rounded knobs. Ninth segment with anterolateral angle narrowly produced; posterior margin deeply, and broadly divided dorsally with a pair of linear sclerites in division; posterolateral margin bearing a slender, decurved sclerite from its inner surface; apicoventrally with an indistinct sclerite. Tenth tergum very narrow, consisting of lateral bands united midventrally. Aedeagus tubular, slightly constricted, with a subapical ring, and a long slender internal spine.

**MATERIAL.**—Holotype, male. MEXICO: SAN LUIS POTOSI: Tierra Blanca, 6.3 miles south of Tamazunchale, 5 Aug. 1966, O. S. Flint, Jr. USNM Type 70918. Paratypes: Same data, 1 ♂; Rancho Quemado, 3.5 miles south of Tamazunchale, 4–6 Aug. 1966, 1 ♂.

*Alisotrichia blantoni*, new species

FIGURES 186–189, 249

This species seems closely related to *A. quemada* on one side, and a little more distantly to *A. tamaza* on the other. All three are quite similar in appearance of the male genitalia, although differing in details. From

*quemada* it differs in having unmodified basal antennal segments, and from both in the genitalic structure, especially the aedeagus which possesses several internal spines in *blantoni*.

**ADULT.**—Length of forewing, 2 mm. Specimens cleared and in alcohol. Basal antennal segment cylindrical, about 1½ times as long as broad. Ocelli 3. Spurs 0, 2, 4. Male genitalia: No sternal processes. Eighth sternum proportionately short and broad, posteroventral margin concave. Ninth segment with anterolateral angle slightly produced; posterior margin deeply and broadly emarginate, dorsally with a pair of crescentic sclerites; posterolateral margin bearing a slender process, first directed mesally then ventrad; midventrally with a bordered rectangular emargination. Aedeagus slightly constricted subbasally, with a central tubule, becoming flared and open apically, flanked by two large curved spines and beyond with 3 or 4 smaller curved spines.

**MATERIAL.**—Holotype, male. MEXICO: SAN LUIS POTOSI: Rancho Quemado, 3.5 miles south of Tamazunchale, 4–6 Aug. 1966, O. S. Flint, Jr. USNM Type 70919. Paratypes: Same data, 1 ♂ (lacking abdomen); El Salto, 8 May 1964, F. S. Blanton et al., 32 ♂.

*Alisotrichia tamaza*, new species

FIGURES 190–193, 248

This is probably closest to the following species, *trifida*, although it also shows some similarity to *blantoni*. From these, it is recognized by the narrow, sharply decurved lateral process of the ninth segment, and even more clearly by the internal structure of the aedeagus.

**ADULT.**—Length of forewing, 2.5–3 mm. Color fuscus, with scattered silvery hairs especially on mesonotum and apically on forewings. Basal antennal segment simple, about 1½ times as long as broad. Ocelli 3. Spurs 0, 2, 4. Male genitalia: No sternal processes. Eighth sternum short and broad, posterior margin concave. Ninth segment with anterolateral angle truncate; posterior margin broadly emarginate dorsally with a pair of crescentic sclerites; posterolateral margin bearing a slender process arising from a convoluted base, and angled sharply ventrad; apicoventrally with a bordered, ovate emargination. Aedeagus constricted subbasally, with a central tubule, apex

internally with 3 long processes, lateral ones bearing basally a heavily sclerotized plate.

**MATERIAL.**—Holotype, male. MEXICO: OAXACA: Tamazulapan, 7–8 June 1967, Flint and Ortiz. USNM Type 70920. Paratypes: Same data, 8♂.

***Alisotrichia trifida*, new species**

FIGURES 194–197, 248

Although very similar to *A. tamaza*, this species is quickly recognized by the broader, less angled lateral process of the ninth segment and the broad, apicolateral processes of the aedeagus.

**ADULT.**—Length of forewing, 1.5 mm. Color fuscus, sparsely overlain with silvery hairs, face white. Basal antennal segment unmodified, slightly longer than broad. Ocelli 3. Spurs 0, 2, 4. Male genitalia: No sternal processes. Eighth sternum short and broad, posterior margin evenly concave. Ninth segment with anterolateral angle slightly and broadly produced; posterior margin broadly emarginate, with a pair of projecting, crescentic sclerites; posterolateral margin bearing a broad, slightly curved process with an angulate tip; midventrally with a deep emargination. Aedeagus constructed subbasally, with a central tubule, apex internally with 3 processes, lateral ones being broad dorsoventrally and with a dark lateral sclerite basally.

**MATERIAL.**—Holotype, male. GUATEMALA: IZABAL: Las Escobas near Matias de Galvez, 14–16 Aug. 1965, Flint, Spangler, and Ortiz. USNM Type 70921. Paratype: Same data, 1♂.

***Alisotrichia dominicensis* Flint**

FIGURES 198–201, 247

*Alisotrichia dominicensis* Flint 1968b, p. 44.

This rather odd species is probably most closely related to the following, *wirthi* Flint. It is easily recognized by the straplike, tenth tergum with its pendant ventromesal process.

**ADULT.**—Length of forewing, 2 mm. Color mostly fuscus; antenna yellowish; face and mesonotum with white hairs, forewing white basally and at midlength. Ocelli 3. Basal antennal segment unmodified. Spurs 0, 3, 4. Male genitalia: Seventh sternum with an apicomeral process. Eighth sternum broad, slightly produced apicolaterally. Ninth segment heavily sclerotized along margins, somewhat produced anterolaterally. A

semimembranous, bilobed structure arising ventrolaterally of ninth segment. Tenth tergum consisting of an elongate, dorsomesal, straplike structure slightly upturned apically, and an elongate, pendant structure ventromesally. Aedeagus tubular, constructed at midlength; apical portion with 2 small internal spines.

**MATERIAL.**—DOMINICA: 2.2 miles east of Pont Casse, 7 May 1964, O. S. Flint, Jr., ♂ holotype; same, but 3 May 1964, 1♀ paratype; 2.5 miles east of Pont Casse, 16 Jan. 1965, W. W. Wirth, ♀ allotype, 2♀ paratypes; Fond Figes, 25 Jan. 1965, W. W. Wirth, 2♂ paratypes; Morne Nicholls, 9 Nov. 1964, P. J. Spangler, 1♀ paratype.

***Alisotrichia wirthi* Flint**

FIGURES 202–205, 248

*Alisotrichia wirthi* Flint, 1968b, p. 46.

This species is probably closest to the preceding, *A. dominicensis* Flint, but is easily distinguished by the structure of the male genitalia, especially the structure of the claspers and tenth tergum.

**ADULT.**—Length of forewing, 2.5 mm. Color in alcohol uniformly fuscus. Antennae with basal segments unmodified. Ocelli 3. Spurs 0, 3, 4. Male genitalia: Lacking sternal processes. Eighth tergum broad; sternum produced apicoventrally, truncate. Ninth segment quadrate in lateral aspect, posterior margin raised into a dorsomesal point, posterolateral margin produced into a small rounded lateral lobe; ventrolaterally with a rodlike sclerite arising near anterior margin. Clasper with a terete ventrolateral lobe and a flattened mesal lobe bearing a stout seta dorsally. Tenth tergum with a pair of elongate, pointed sclerites dorsally, a triangular sclerite laterally, and a flattened mesoventral sclerite lying within the mesal lobes of the claspers. Aedeagus sharply constructed at midlength; apical portion with a lightly sclerotized internal spine.

**MATERIAL.**—DOMINICA: Fond Figes, 13 March 1965, W. W. Wirth, ♂ holotype; same, but 6 April 1964, O. S. Flint, Jr., ♂ paratype.

***Alisotrichia septempunctata* Flint**

FIGURES 206–209, 249

*Alisotrichia septempunctata* Flint, 1968b, p. 46.

This is a very distinctive species, both in appearance and in the structure of the male genitalia. The rodlike structure of the claspers is reminiscent of the genus



*Leucotrichia*, but the structure of the aedeagus clearly indicates that the species belongs to *Alisotrichia*.

**ADULT.**—Length of forewing, 2.5 mm. Black; each forewing with 3 bright green spots, mesonotum with a bright green mesal spot. Basal antennal segment unmodified. Ocelli 3. Spurs 0, 3, 4. Male genitalia: No sternal processes. Eighth tergum broad; sternum slightly produced and rounded ventrolaterally. Ninth segment with anterolateral angles greatly produced; with posterolateral margin produced into an upturned pointed process. Claspers completely fused, developed into a long, rodlike, ventromesal process. A terete semimembranous process arising mesad of posterolateral process of ninth segment and twisted around it. Lateral penis sheath broad, produced into apicomesal beak; dorsally with a pair of parenthesislike sclerites. Aedeagus constricted, apical portion with several pairs of elongate internal spines; a ventral tube slightly enlarged distally.

**MATERIAL.**—DOMINICA: 2.2 miles east of Pont Casse, 14 April 1964, O. S. Flint, Jr., holotype ♂.

### *Alisotrichia* species 1

FIGURE 219

*Alisotrichia* species 1, Flint, 1968b, p. 43.

The larva here described is very similar to that of *A. orophila* Flint, but is a bit larger, and the thoracic nota and abdominal terga possess a few more enlarged setae. The first abdominal tergum lacks the central dark mark, and the pores on the following segments are in front of the black mark rather than surrounded by it as in *orophila*.

**LARVA.**—Length 1.5 mm. Body ruptured and strongly contracted, thereby distorting proportions. Sclerites pale brown. Pronotum divided longitudinally; mesonotum and metanotum entire; without surrounding sclerotized points. Legs probably extending laterad in plane of body; coxae and femora with dorsal combs of enlarged setae. Enlarged setae of thoracic nota and abdominal tergites short, black and truncate, setae laterally on thorax and on legs longer and more pointed. Abdomen with 9 tergites; anteromost closely associated with metanotum, without lateral sclerites or central dark mark; tergites 2–8 with 3 pores anterior to posteromesal dark mark; anterolateral sclerites large. Anal claw with enlarged apicodorsal seta.

**MATERIAL.**—DOMINICA: .5 mile south of Pont Casse, 22–24 July 1963, O. S. Flint, Jr., 1 larva.

### *Alisotrichia* species 2

FIGURE 227

*Alisotrichia* species 2, Flint, 1968b, p. 47.

The larvae here described seem conspecific, and may very well be those of *A. dominicensis* or *wirthi*. They are very distinctive in terms of body proportions, shape of enlarged setae, sclerites, and legs.

**LARVA.**—Length to 3.5 mm. Sclerites brown. Pronotum divided longitudinally; mesonotum and metanotum entire; mesonotal and metanotal tergites with small sclerotized points anteriorly, and small sclerites posteriorly. Legs shorter, apparently operating in a plane vertically to that of body; coxae and femora with a single dorsal seta each, those of femora feathered. Enlarged setae of thoracic nota, legs, and abdomen long, dark, and pointed, arising from conspicuous pale spots. Abdomen (excluding anal prolegs) over twice as long as thorax,  $2\frac{1}{2}$  times as long as width at widest segment. Abdomen with 9 tergites; anteromost on a distinct (but small) segment; segments 1–8 with small sclerotized points bordering tergites posteriorly, with small intercalary sclerites between segments, and with a black mark without pores centrally; anterolateral sclerites small, capping lateral protuberances. Anal claw with apicodorsal seta only slightly enlarged, pale.

**MATERIAL.**—DOMINICA: Riviere Laurent, 21 July 1963, O. S. Flint, Jr., 1 larva; Geneva Estate, 9 Dec. 1964, P. J. Spangler, 1 larva; Fond Figues River, 9 Feb. 1965, W. W. Wirth, 1 larva.

### *Alisotrichia* species 3

FIGURES 220–221

I am here describing the few larval specimens from the continent which are all very similar. The specimen from Utah, however, differs from those of Central America (which are illustrated) in being larger, and bearing more enlarged setae on the thoracic nota and abdominal tergites.

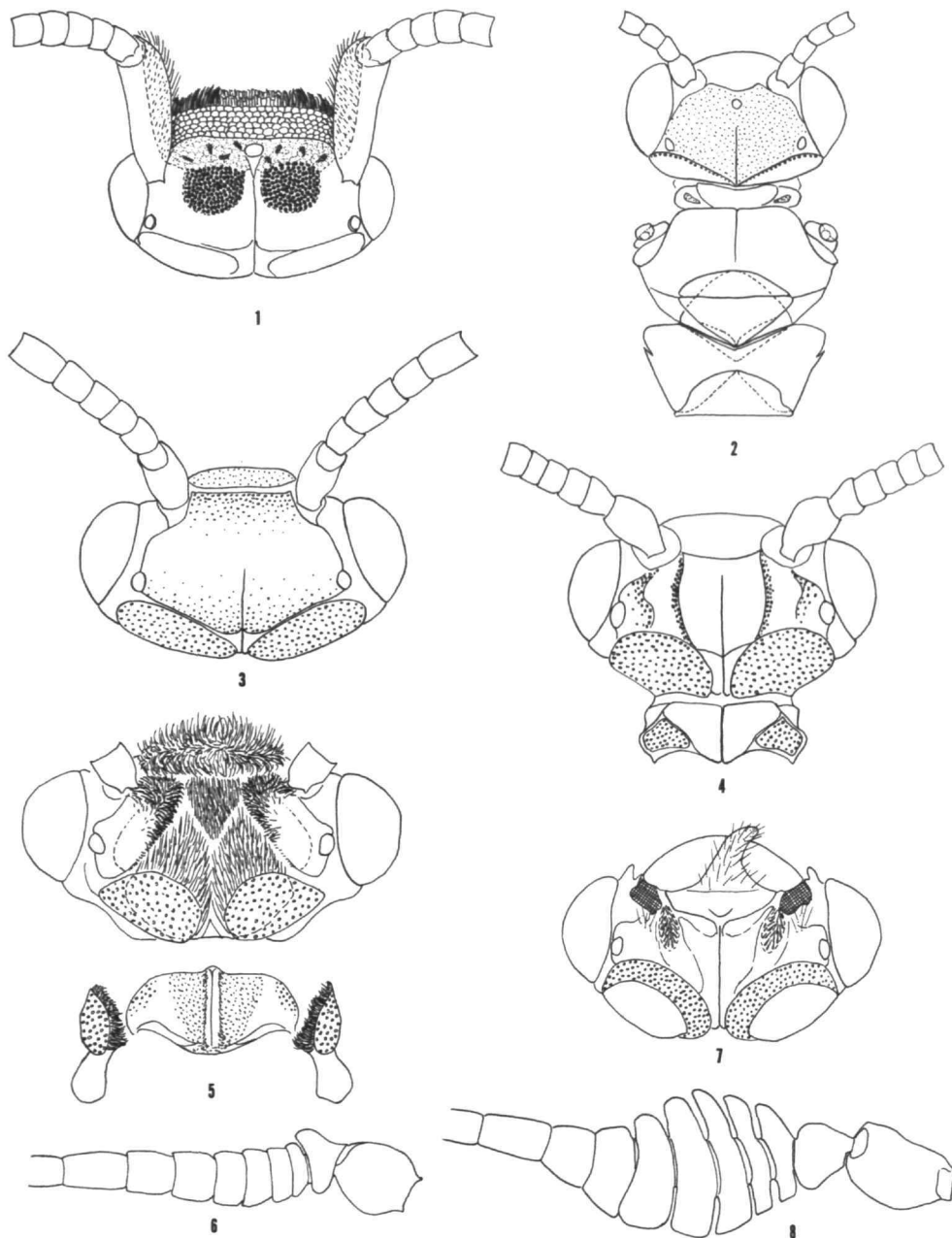
**LARVA.**—Length to 3 mm. Sclerites brown or pale brown. Pronotum divided for posterior third only; mesonotum and metanotum entire; no sclerotized points. Legs extending laterad, but operating in a more nearly vertical plane; coxae and femora each with a

single dorsal seta. Enlarged setae of thoracic nota, legs, and abdominal tergites long, dark, and blunt. Abdomen (excluding anal prolegs)  $1\frac{1}{2}$  times as long as thorax,  $3\frac{1}{2}$  times as long as width of widest segment. Abdomen with 9 tergites; anteromost on a distinct segment; without sclerotized points or intercalated sclerites, with a black mark centrally but without a central pore; anterolateral sclerite small, capping lateral protuberances. Anal claw with apicodorsal seta large and black.

**MATERIAL.**—U.S.A.: UTAH: Washington Co., City Springs, .5 mile north of St. George, 2,900 feet, 8 Oct. 1961, A. Dean Stock, 1 larva. MEXICO: MORELOS: Xochitepec, 12–14 July 1965, Flint and Ortiz, 2 larvae. COSTA RICA: PUNTARENAS: Rio Seco, northwest of Esparta, 23 July 1967, O. S. Flint, Jr., 6 larvae.

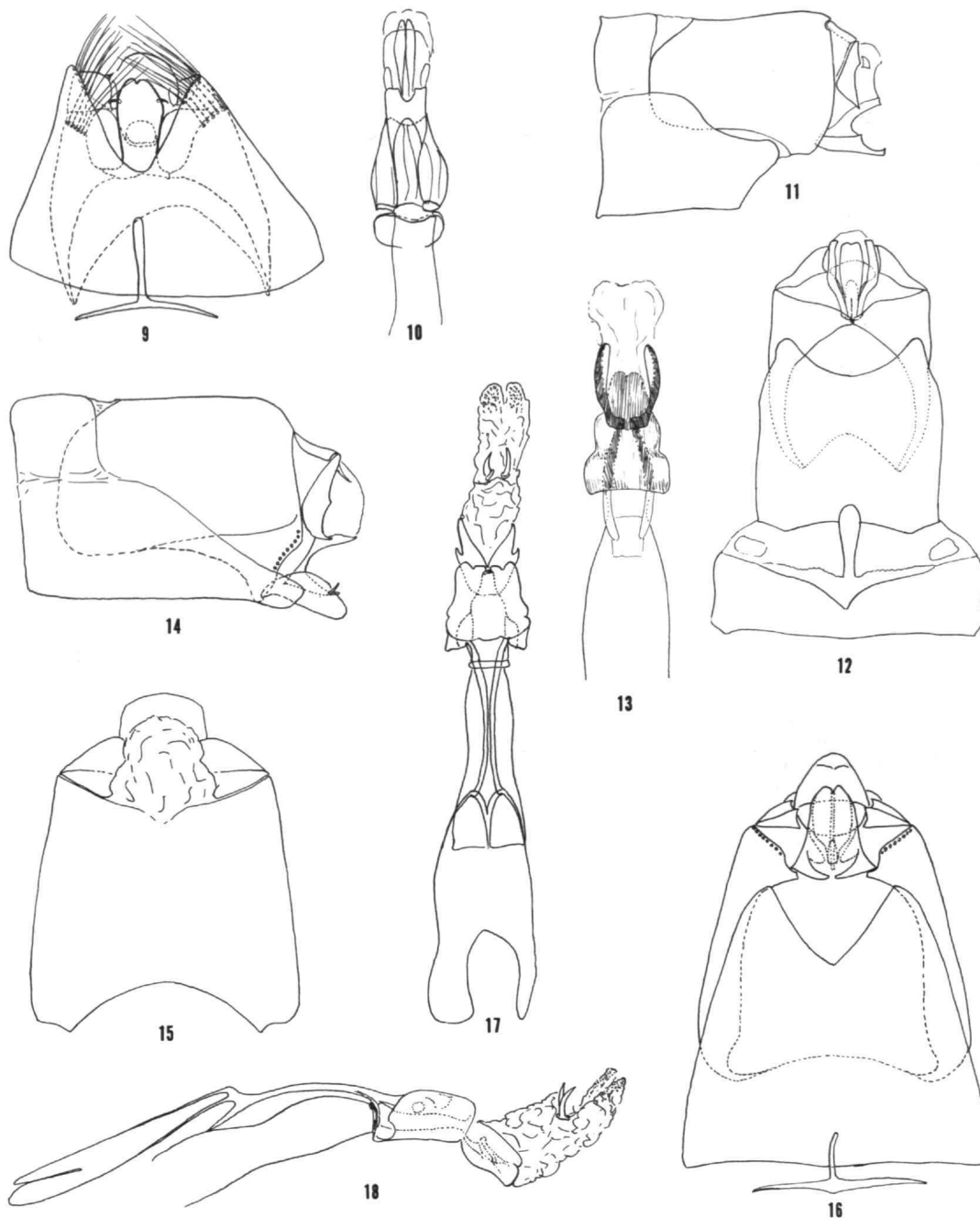
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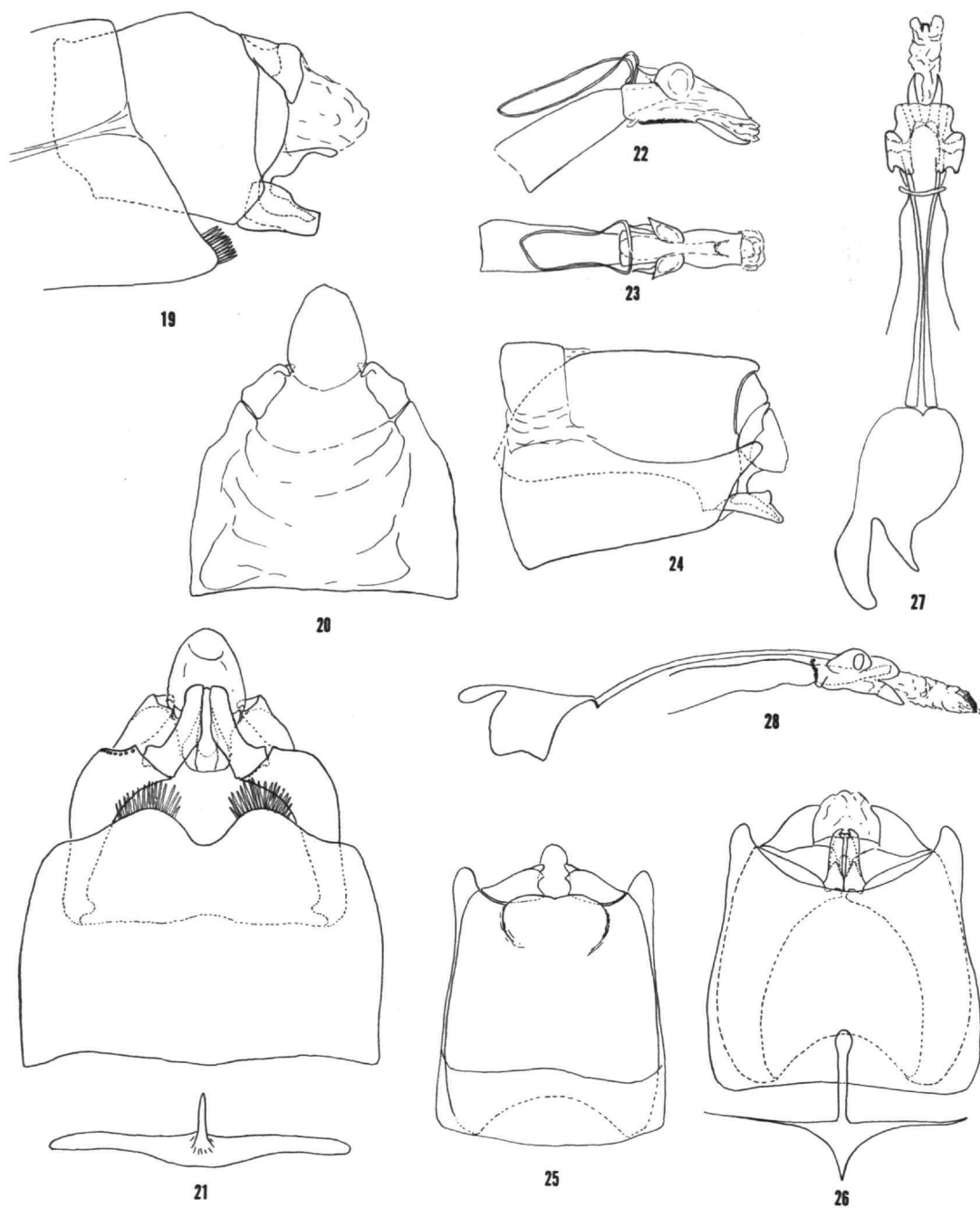


FIGURES 1-8.—*Leucotrichia chiriquiensis*, new species: 1, head, dorsal. *L. melleopicta* Mosely: 2, head and thorax, dorsal. *L. imitator*, new species: 3, head, dorsal. *L. sarita* Ross: 4, head and pronotum, dorsal. *L. pictipes* (Banks): 5, head, pronotum, and tegulae, dorsal; 6, basal segments of antenna, anterior. *L. fairchildi*, new species: 7, head, dorsal; 8, basal segments of antenna, anterior.

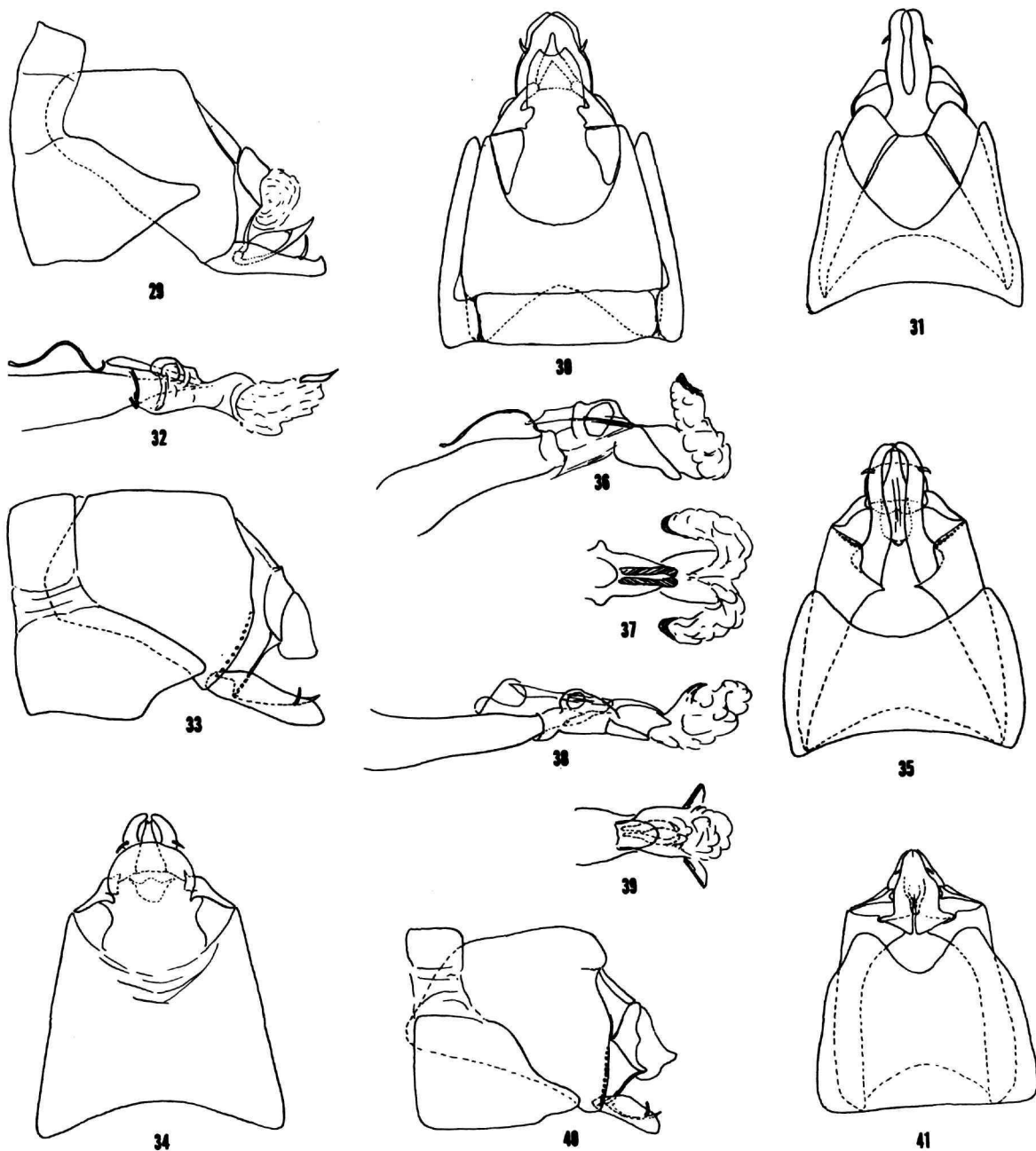




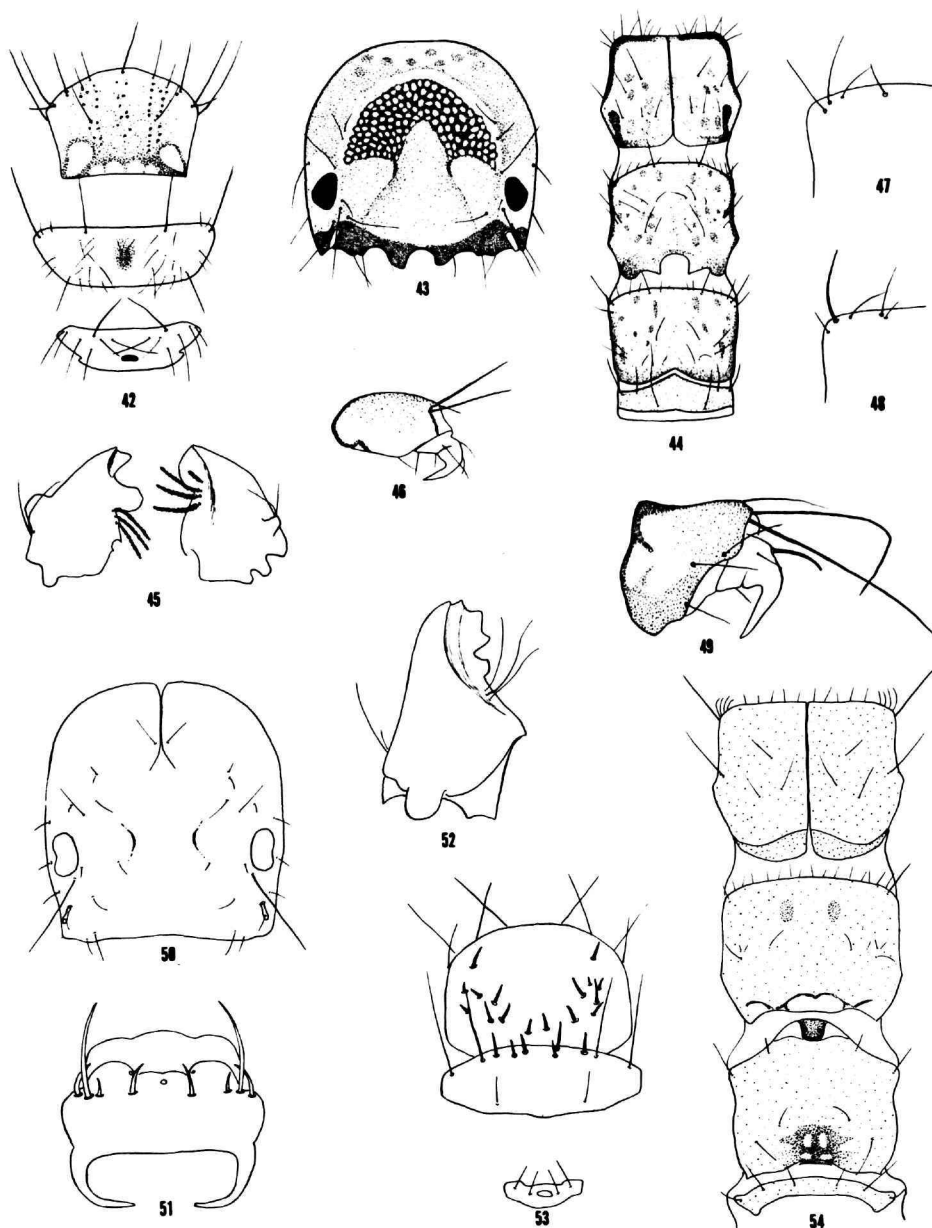
FIGURES 9-18.—*Leucotrichia melleopicta* Mosely: 9, male genitalia, ventral; 10, aedeagus, dorsal. *L. viridis* Flint: 11, male genitalia, lateral; 12, male genitalia, ventral; 13, aedeagus, dorsal. *L. limpia* Ross: 14, male genitalia, lateral; 15, male genitalia, dorsal; 16, male genitalia, ventral; 17, aedeagus, dorsal; 18, aedeagus, lateral.



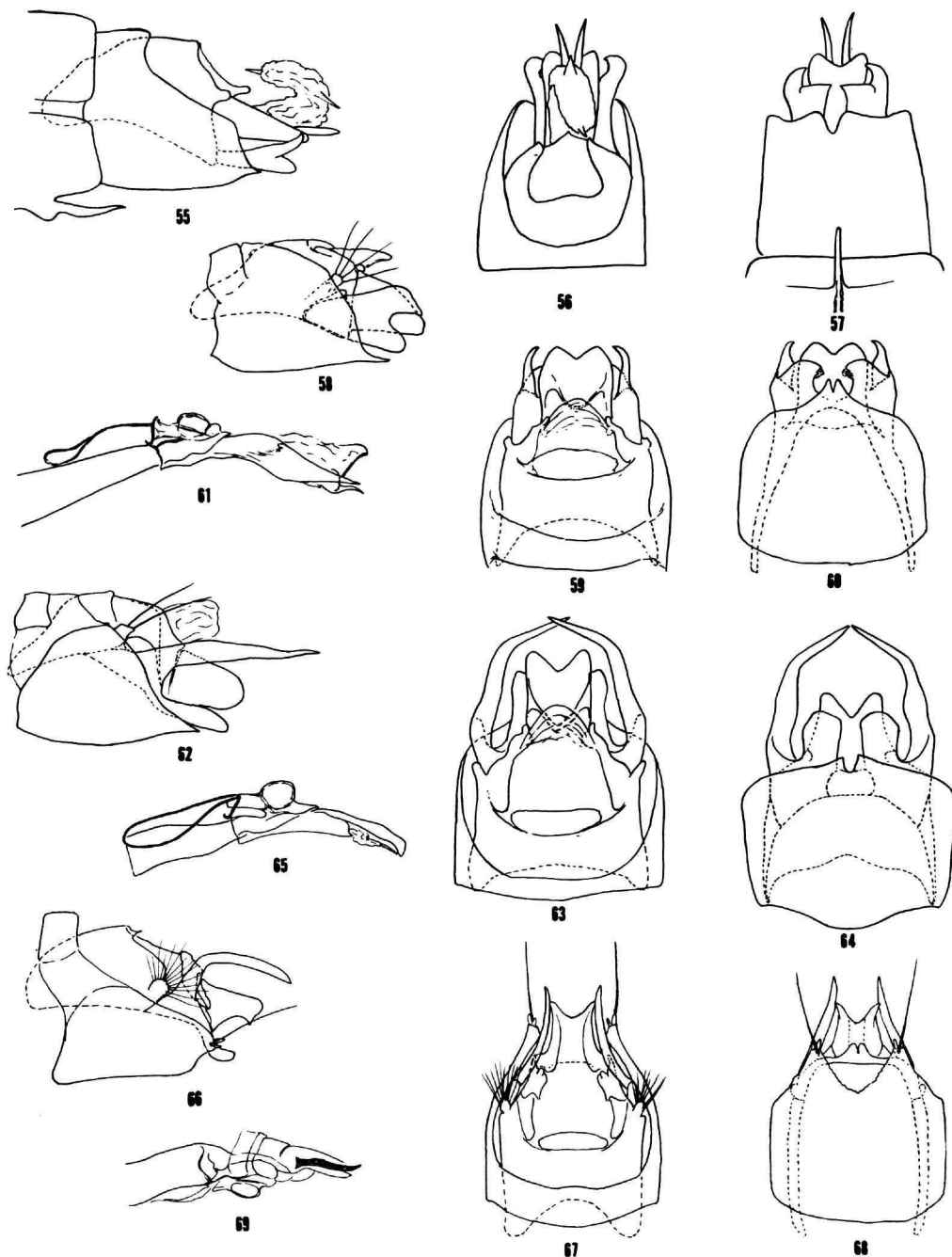
FIGURES 19-28.—*Leucotrichia tubifex* Flint: 19, male genitalia, lateral; 20, male genitalia, dorsal; 21, male genitalia, ventral; 22, aedeagus, lateral; 23, aedeagus, dorsal. *L. chiriquiensis*, new species: 24, male genitalia, lateral; 25, male genitalia, dorsal; 26, male genitalia, ventral; 27, aedeagus, dorsal; 28, aedeagus, lateral.



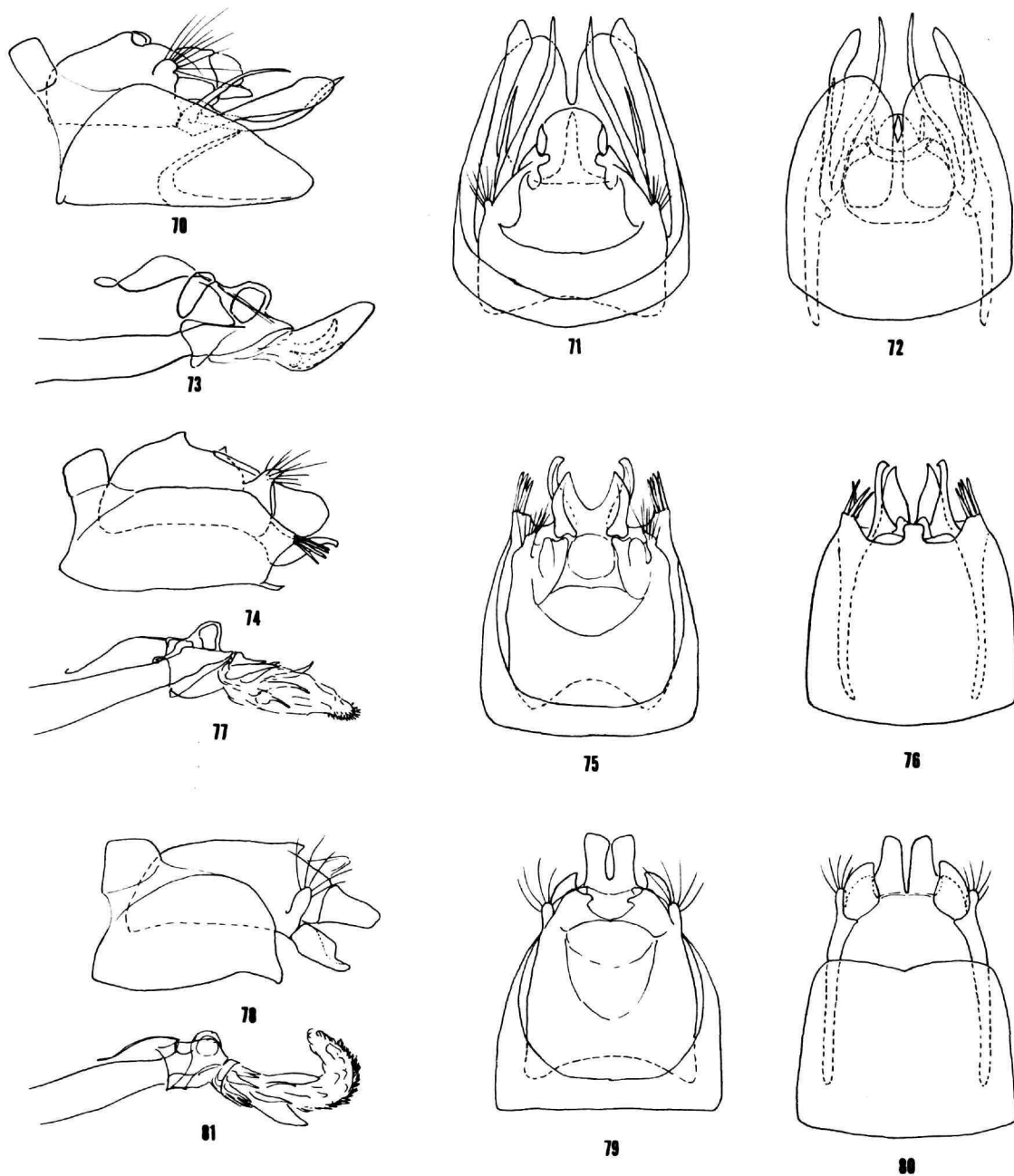
FIGURES 29-41.—*Leucotrichia sarita* Ross: 29, male genitalia, lateral; 30, male genitalia, dorsal; 31, male genitalia, ventral; 32, aedeagus, lateral. *L. imitator*, new species: 33, male genitalia, lateral; 34, male genitalia, dorsal; 35, male genitalia, ventral; 36, aedeagus, lateral; 37, tip of aedeagus, dorsal. *L. pictipes* (Banks): 38, aedeagus, lateral; 39, tip of aedeagus, dorsal; 40, male genitalia, lateral; 41, male genitalia, ventral.



FIGURES 42-54.—*Leucotrichia tubifex* Flint: 42, larval ninth, eighth, and seventh tergites, dorsal; 43, larval head, anterior; 44, larval thoracic nota and first abdominal tergum, dorsal; 45, larval mandibles; 46, larval anal proleg, lateral. *L. pictipes* (Banks): 47, anterolateral angle of larval mesonotum, dorsal. *L. sarita* Ross: 48, anterolateral angle of larval mesonotum, dorsal. *L. limpia* Ross: 49, larval anal proleg, lateral. *Zumatrichia antillensis* Flint: 50, larval head, anterior; 51, larval labrum; 52, larval mandible; 53, larval ninth, eighth, and seventh tergites, dorsal; 54, larval thoracic nota and first abdominal tergum, dorsal.

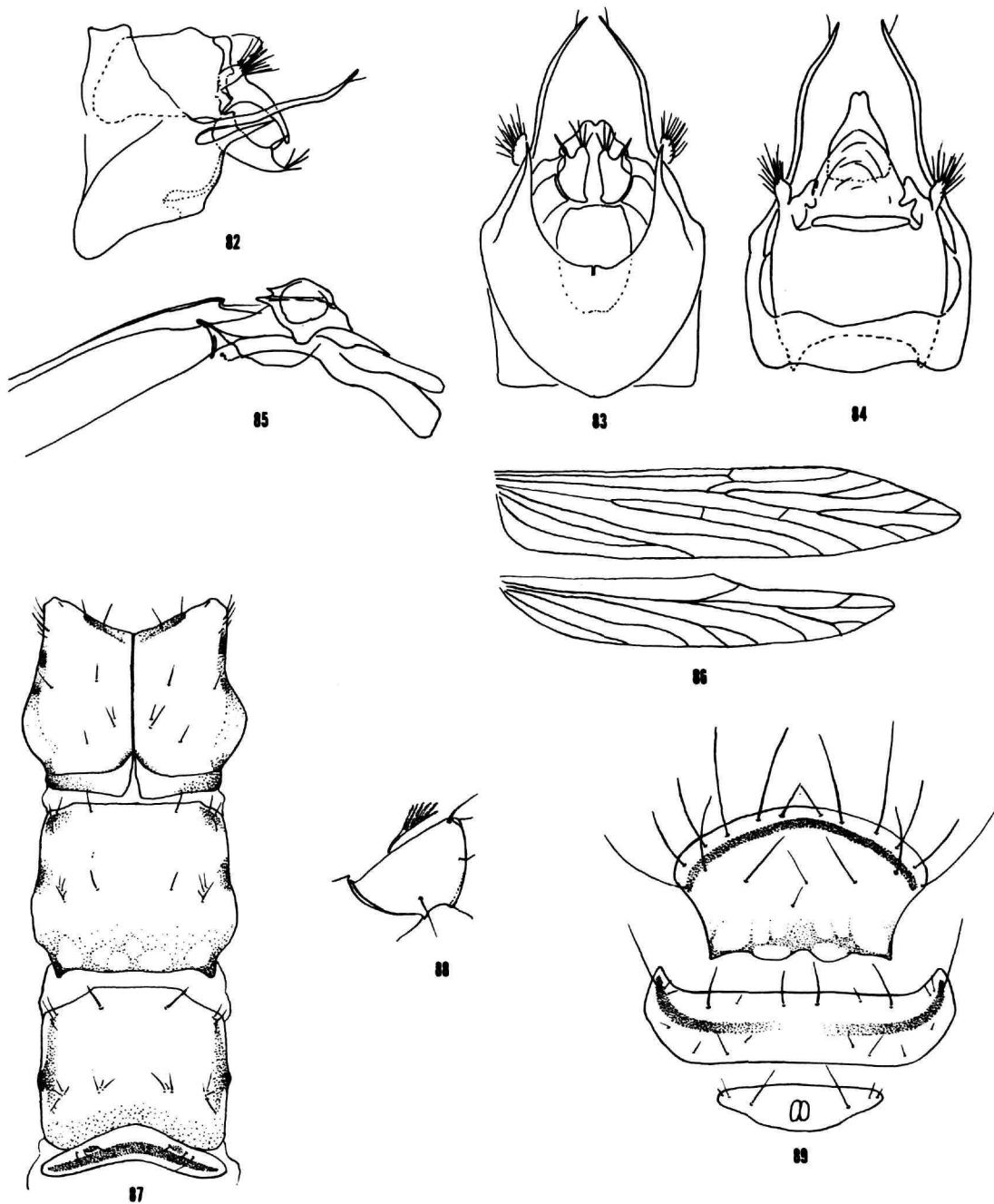


FIGURES 55-69.—*Costatrichia lodora* Mosely: 55, male genitalia, lateral; 56, male genitalia, dorsal; 57, male genitalia, ventral (55-57 after Mosely); 58, male genitalia, lateral; 59, male genitalia, dorsal; 60, male genitalia, ventral; 61, aedeagus, lateral. *C. panamensis* Flint: 62, male genitalia, lateral; 63, male genitalia, dorsal; 64, male genitalia, ventral; 65, aedeagus, lateral. *C. bipartita*, new species: 66, male genitalia, lateral; 67, male genitalia, dorsal; 68, male genitalia, ventral; 69, aedeagus, lateral (midlength complex twisted).

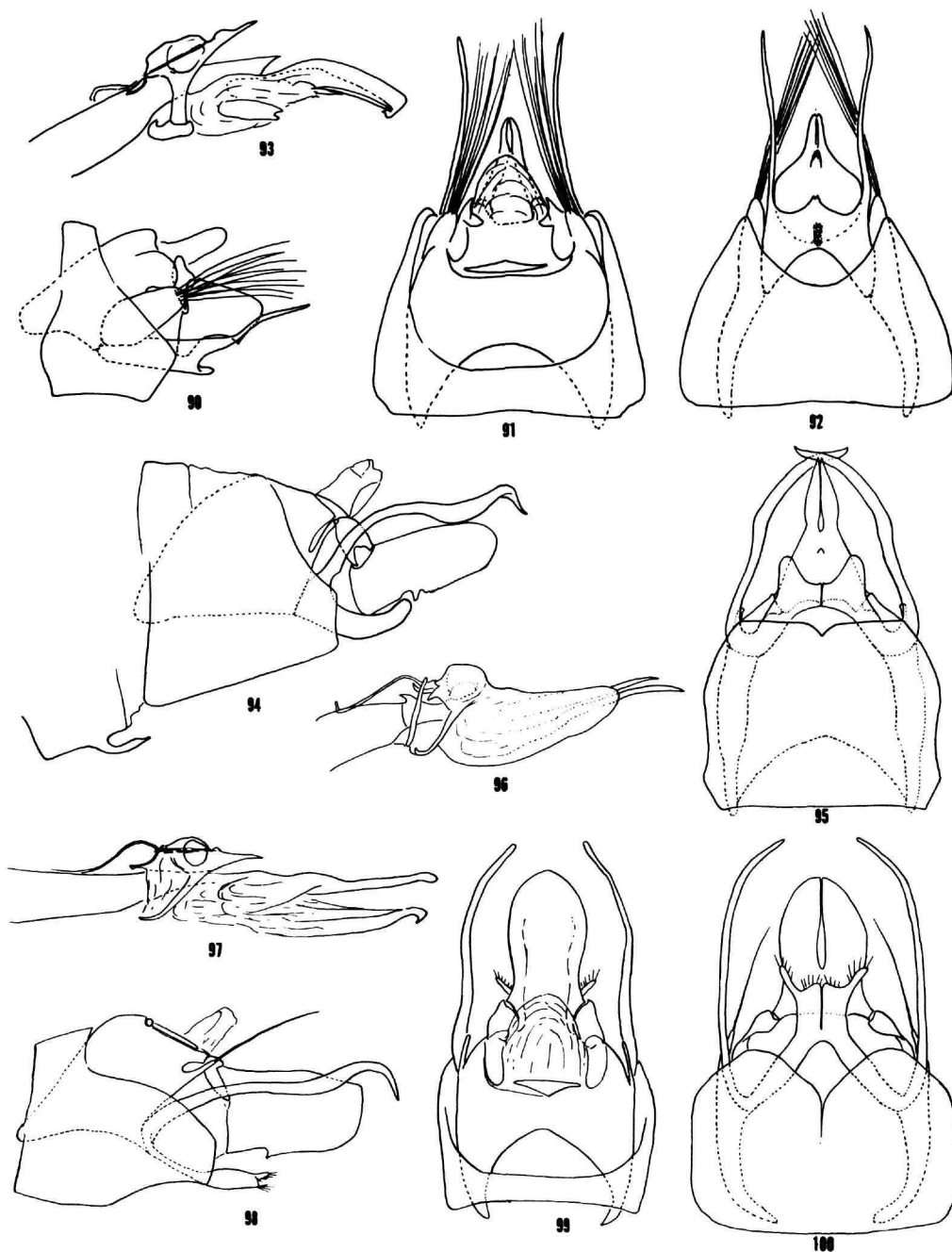


FIGURES 70-81.—*Costatrichia tripartita*, new species: 70, male genitalia, lateral; 71, male genitalia, dorsal; 72, male genitalia, ventral; 73, aedeagus, lateral. *C. spinifera*, new species: 74, male genitalia, lateral; 75, male genitalia, dorsal; 76, male genitalia, ventral; 77, aedeagus, lateral. *C. simplex*, new species: 78, male genitalia, lateral; 79, male genitalia, dorsal; 80, male genitalia, ventral; 81, aedeagus, lateral.

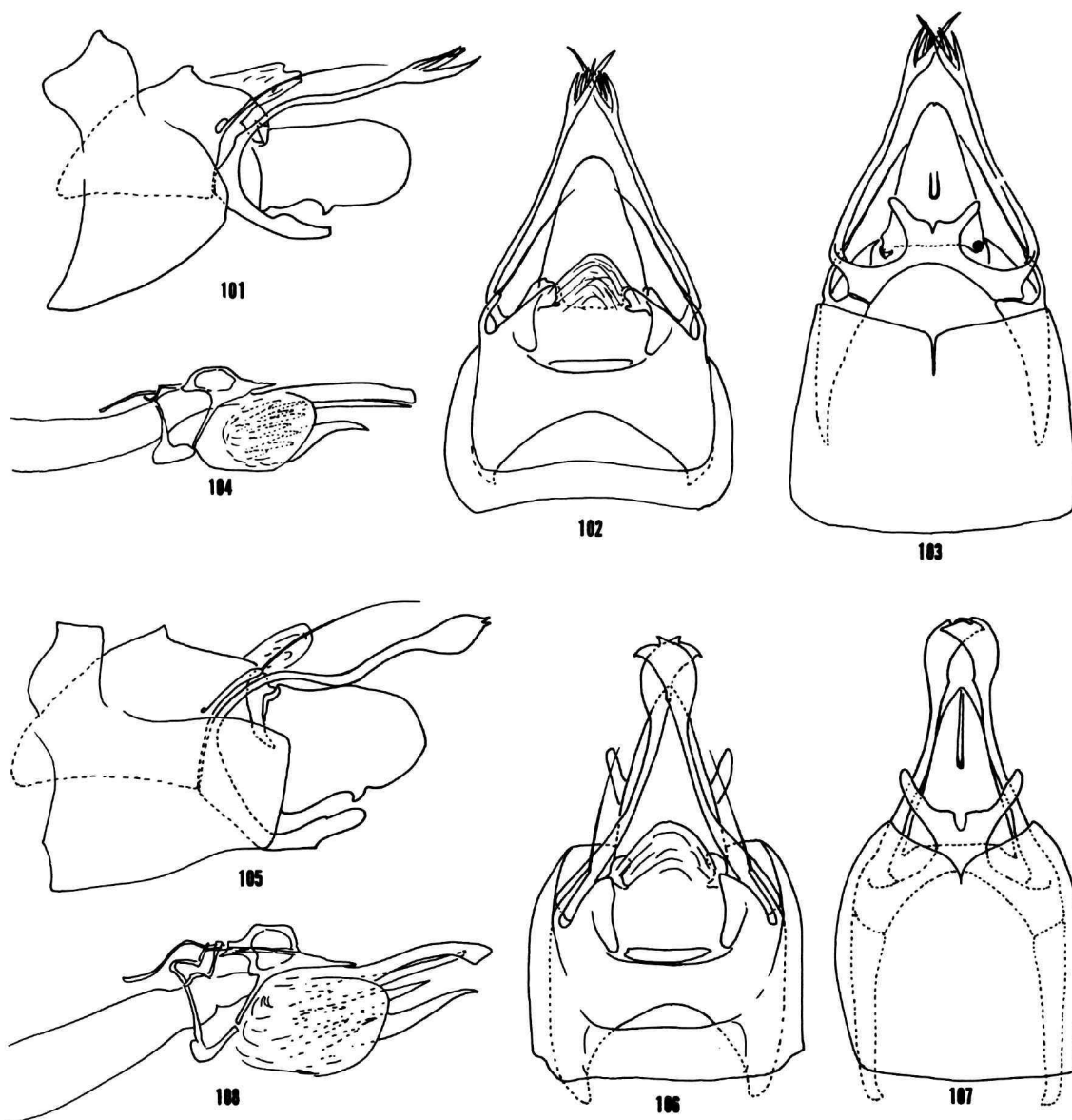




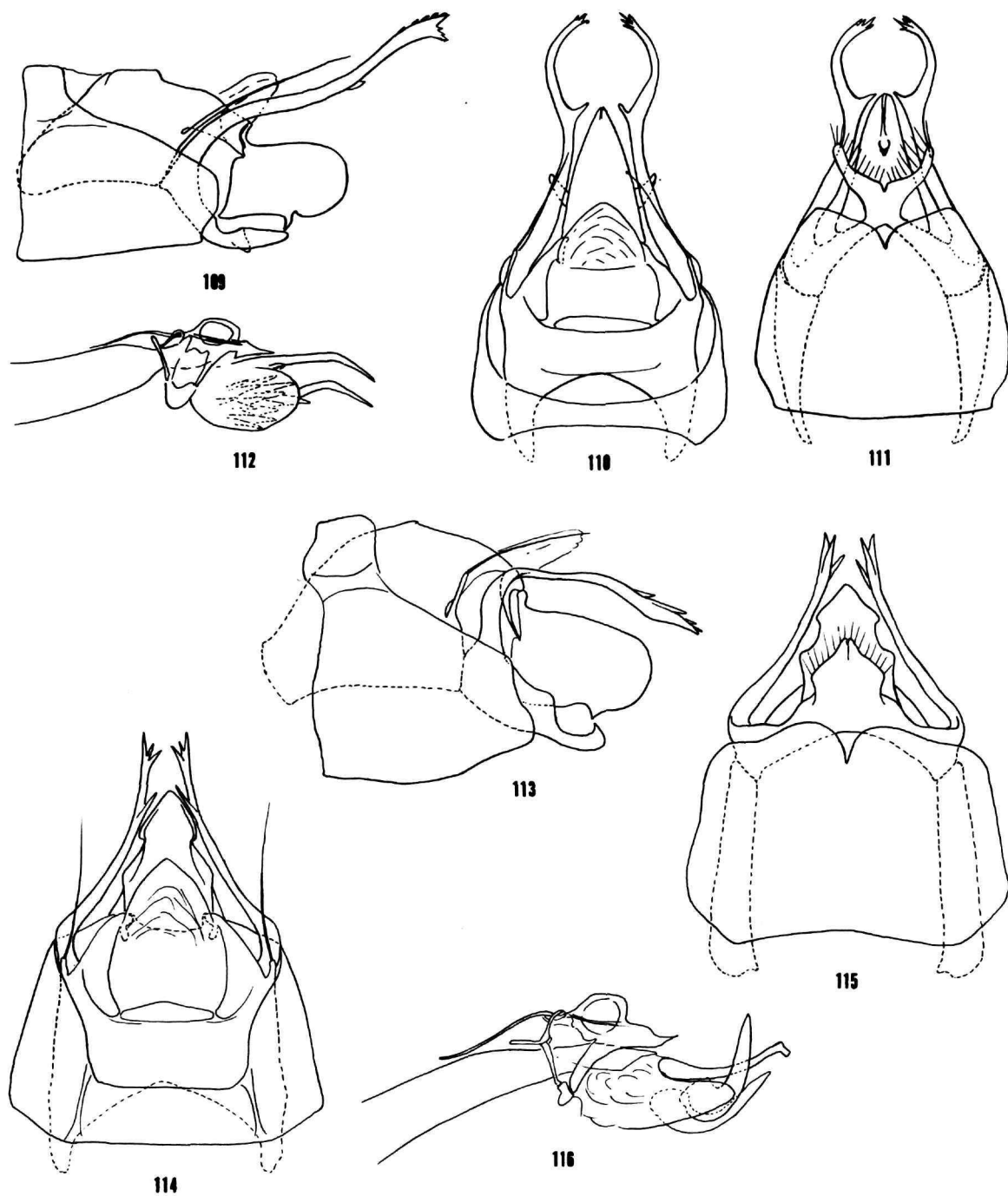
FIGURES 82-89.—*Anchitrichia spangleri*, new genus, new species: 82, male genitalia, lateral; 83, male genitalia, ventral; 84, male genitalia, dorsal; 85, aedeagus, lateral; 86, wings; 87, larval thoracic nota and first abdominal tergum, dorsal; 88, femur of larval foreleg, posterior; 89, larval ninth, eighth, and seventh tergites, dorsal.



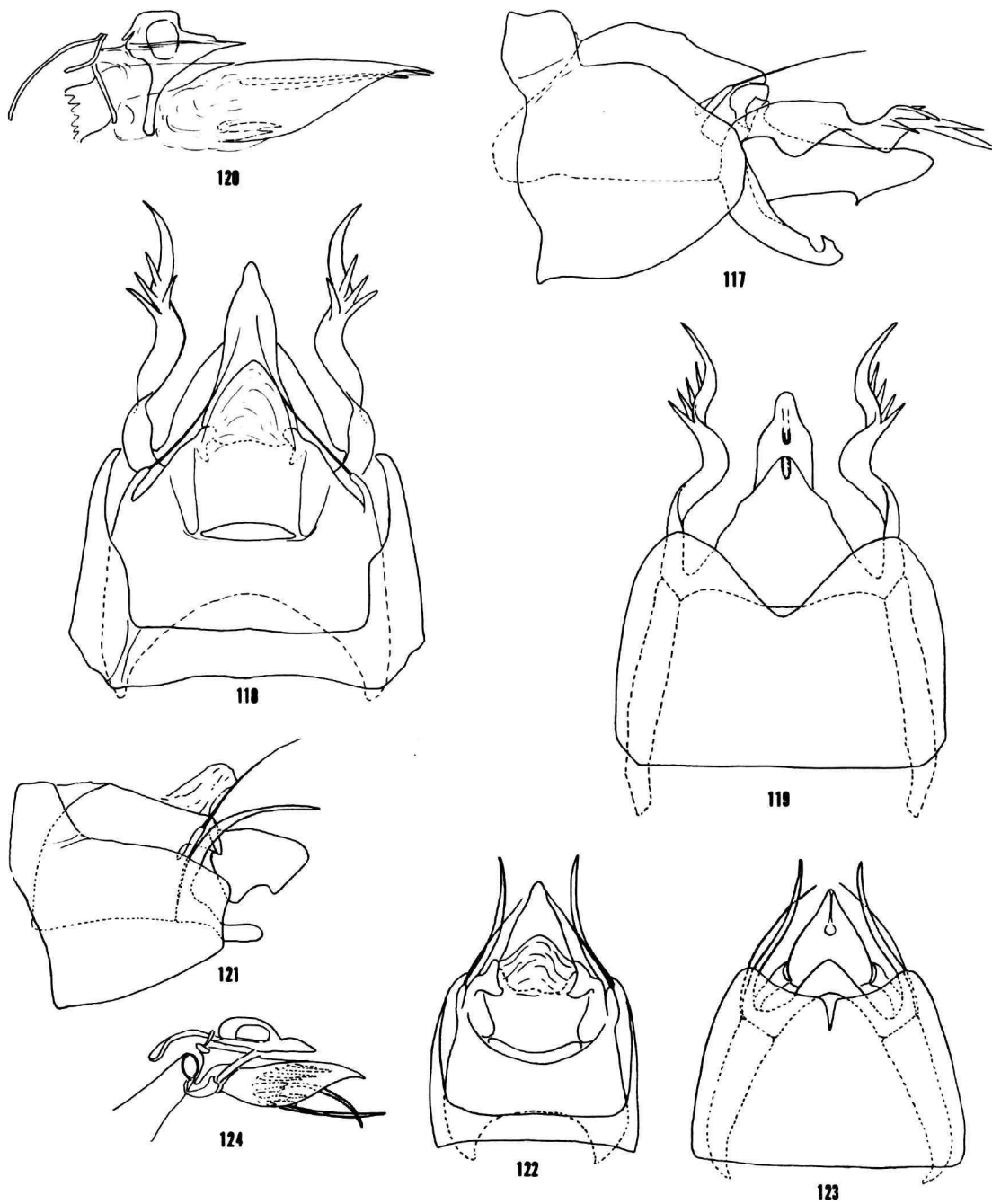
FIGURES 90-100.—*Zumatrichia multisetosa*, new species: 90, male genitalia, lateral; 91, male genitalia, dorsal; 92, male genitalia, ventral; 93, aedeagus, lateral. *Z. echinata* Flint: 94, male genitalia, lateral; 95, male genitalia, ventral; 96, aedeagus, lateral. *Z. antillensis* Flint: 97, aedeagus, lateral; 98, male genitalia, lateral; 99, male genitalia, dorsal; 100, male genitalia, ventral.



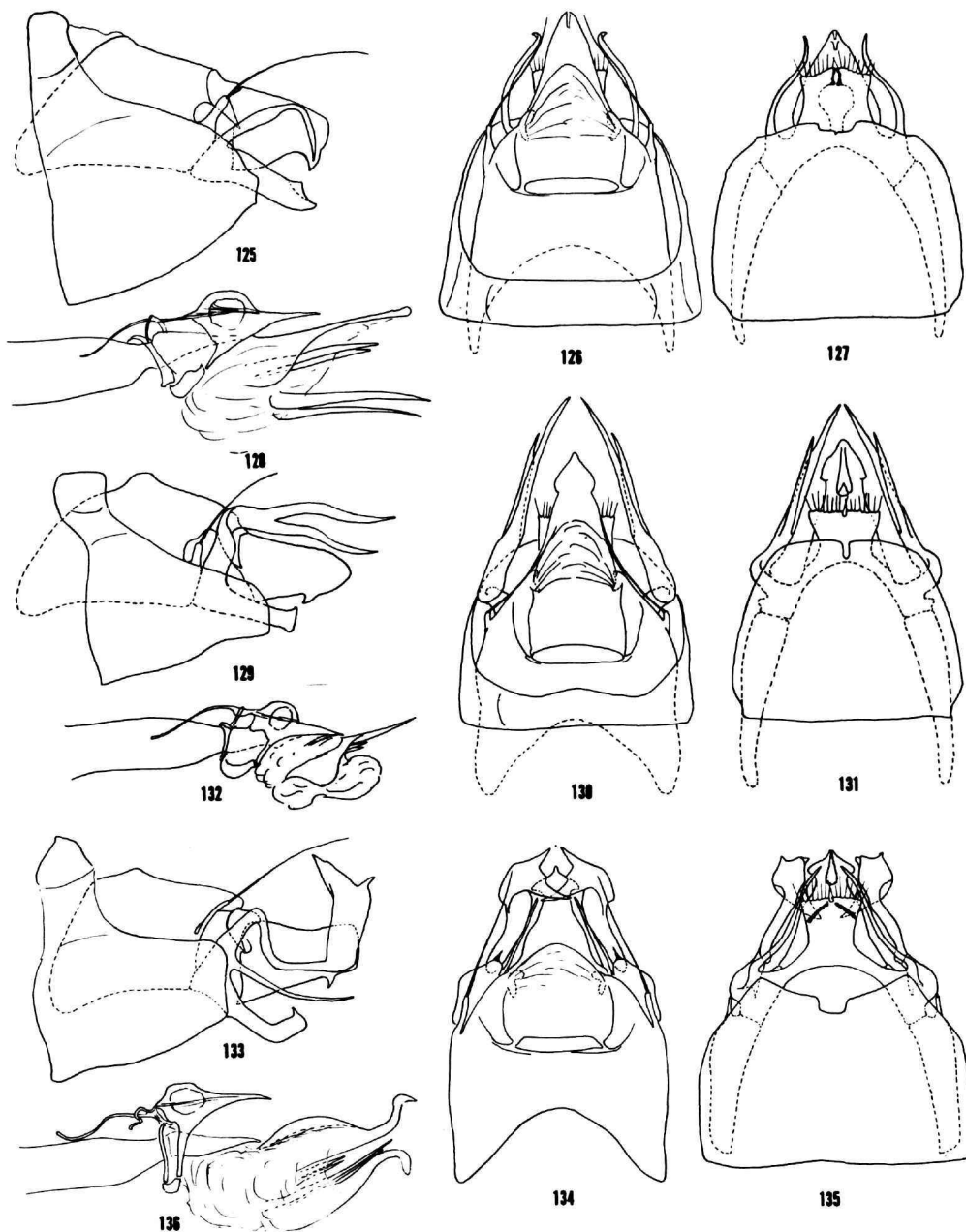
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FIGURES 109-116.—*Zumatrixia vieja*, new species: 109, male genitalia, lateral; 110, male genitalia, dorsal; 111, male genitalia, ventral; 112, aedeagus, lateral. *Z. chiriquiensis*, new species: 113, male genitalia, lateral; 114, male genitalia, dorsal; 115, male genitalia, ventral; 116, aedeagus, lateral.

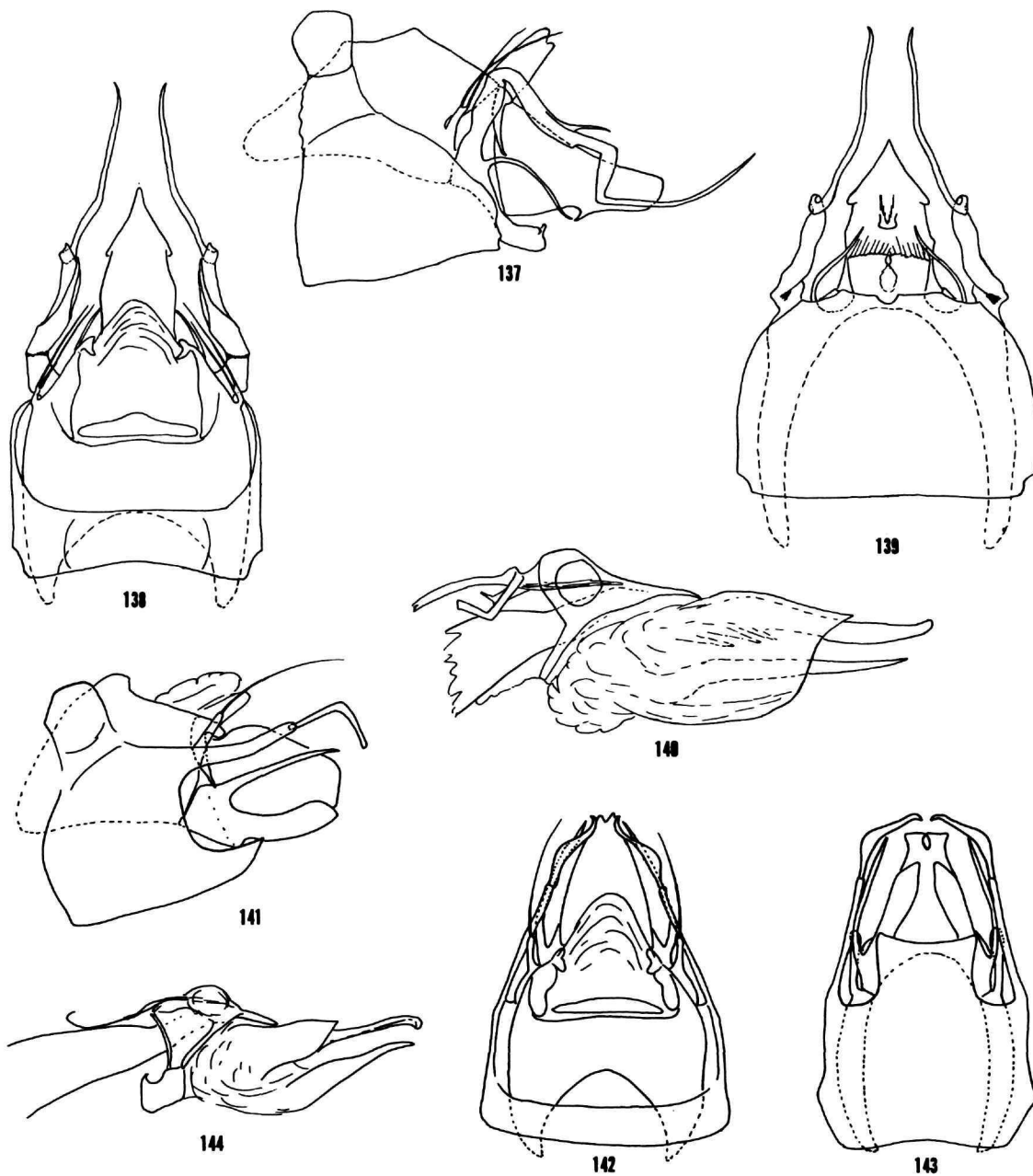


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FIGURES 125–136.—*Zumatricchia angulata*, new species: 125, male genitalia, lateral; 126, male genitalia, dorsal; 127, male genitalia, ventral; 128, aedeagus, lateral. *Z. bifida*, new species: 129, male genitalia, lateral; 130, male genitalia, dorsal; 131, male genitalia, ventral; 132, aedeagus, lateral. *Z. diaphidia*, new species: 133, male genitalia, lateral; 134, male genitalia, dorsal; 135, male genitalia, ventral; 136, aedeagus, lateral.





FIGURES 137-144.—*Zumatrichia attenuata*, new species: 137, male genitalia, lateral; 138, male genitalia, dorsal; 139, male genitalia, ventral; 140, aedeagus, lateral. *Z. palmara*, new species: 141, male genitalia, lateral; 142, male genitalia, dorsal; 143, male genitalia, ventral; 144, aedeagus, lateral.

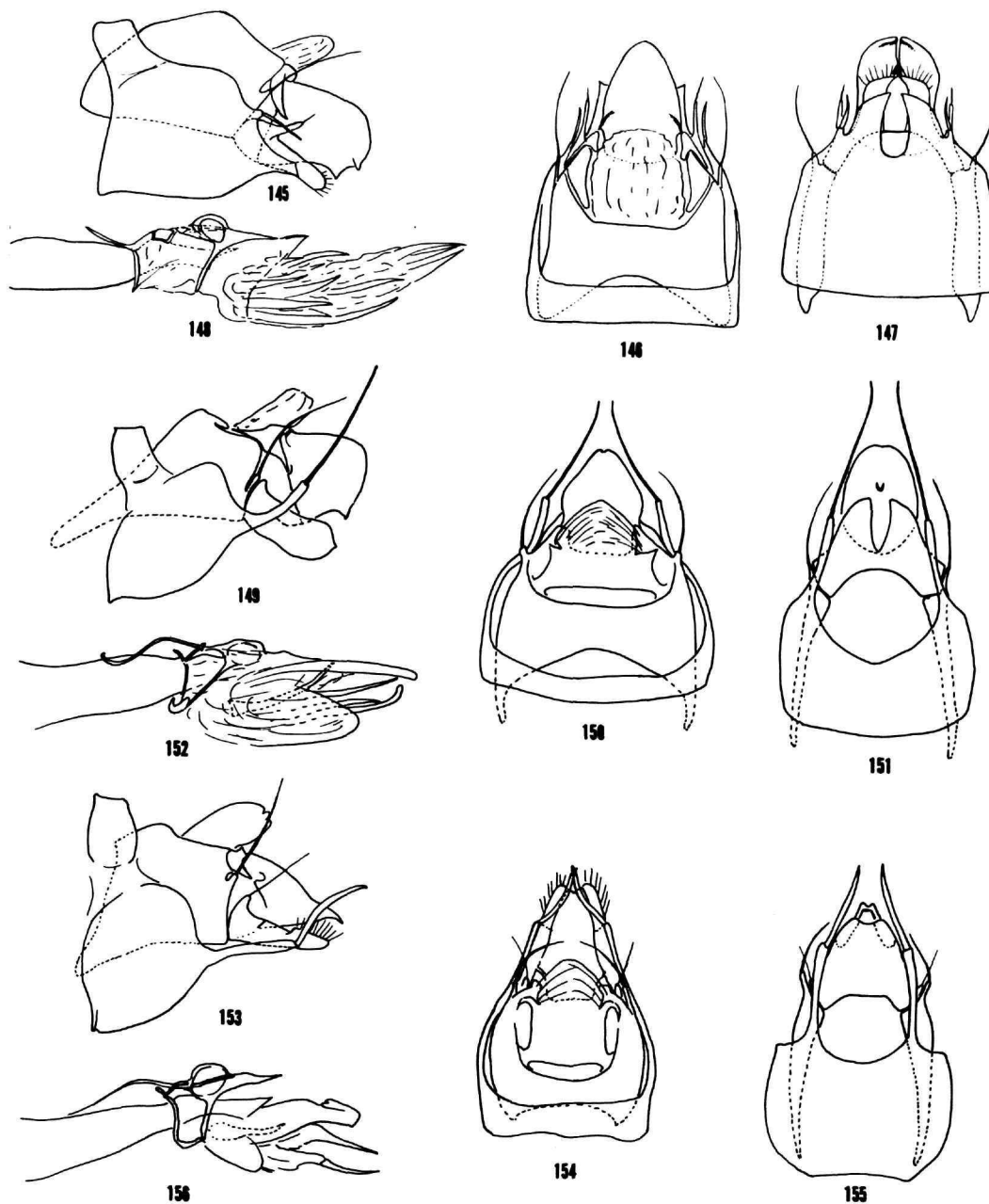
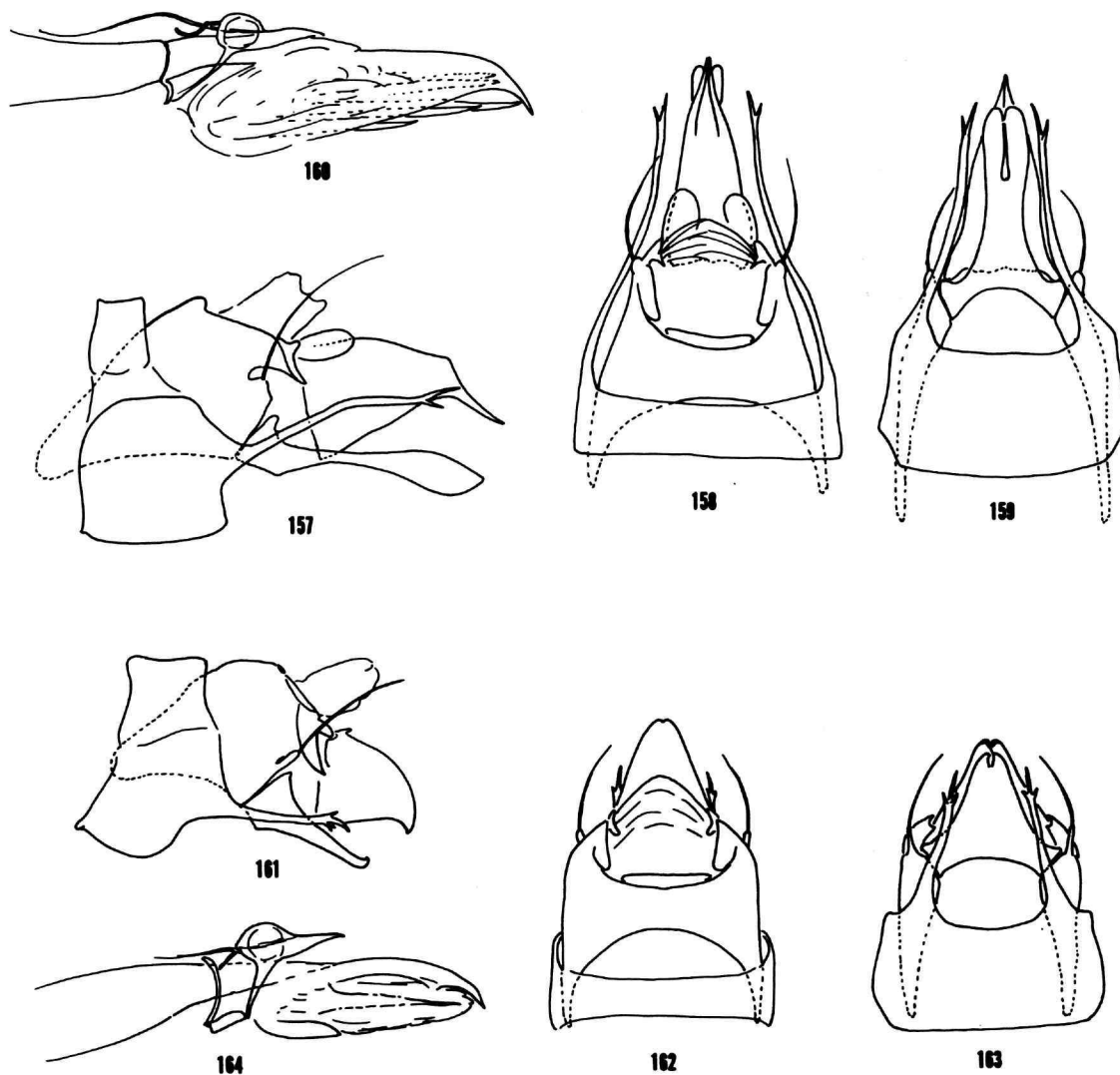
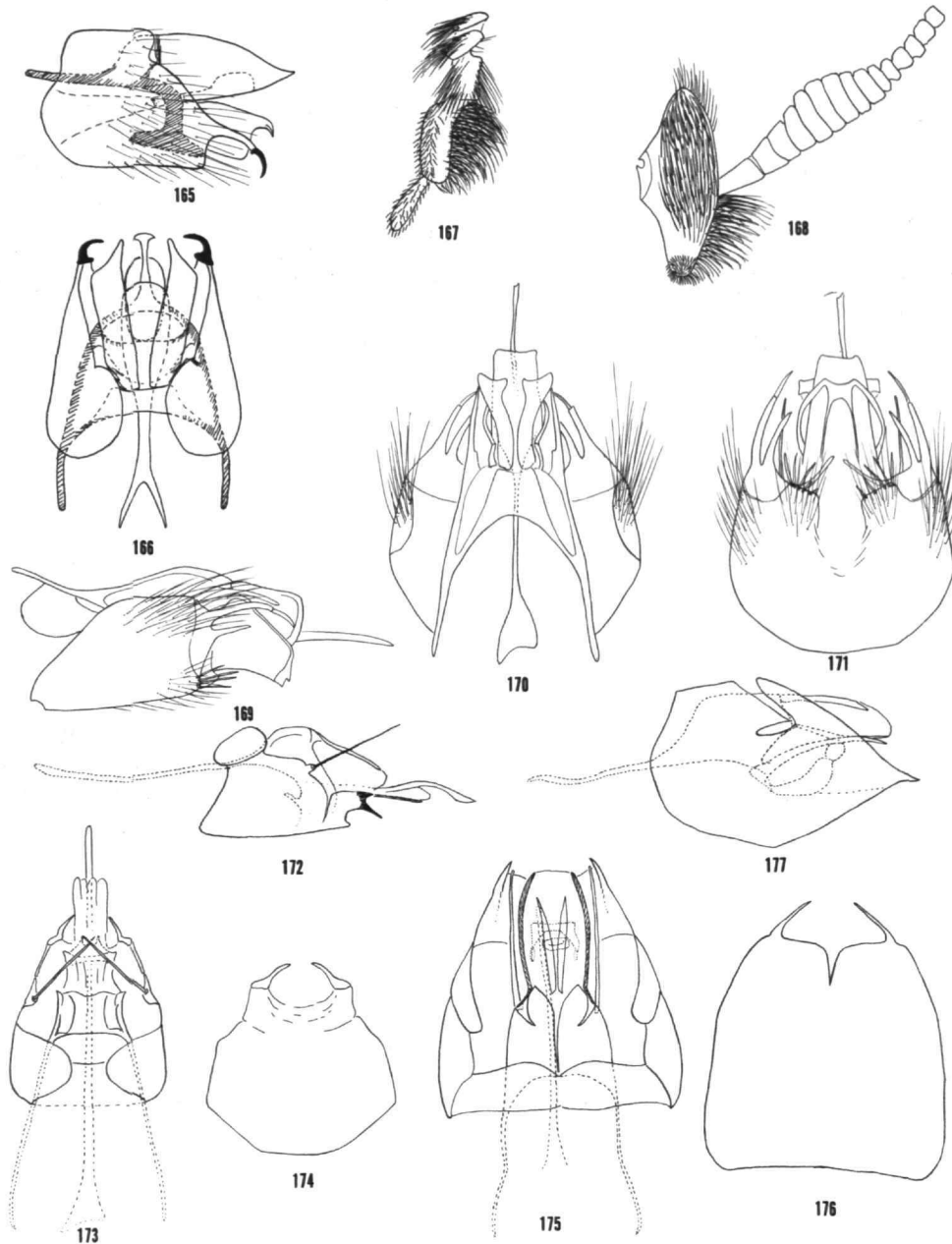


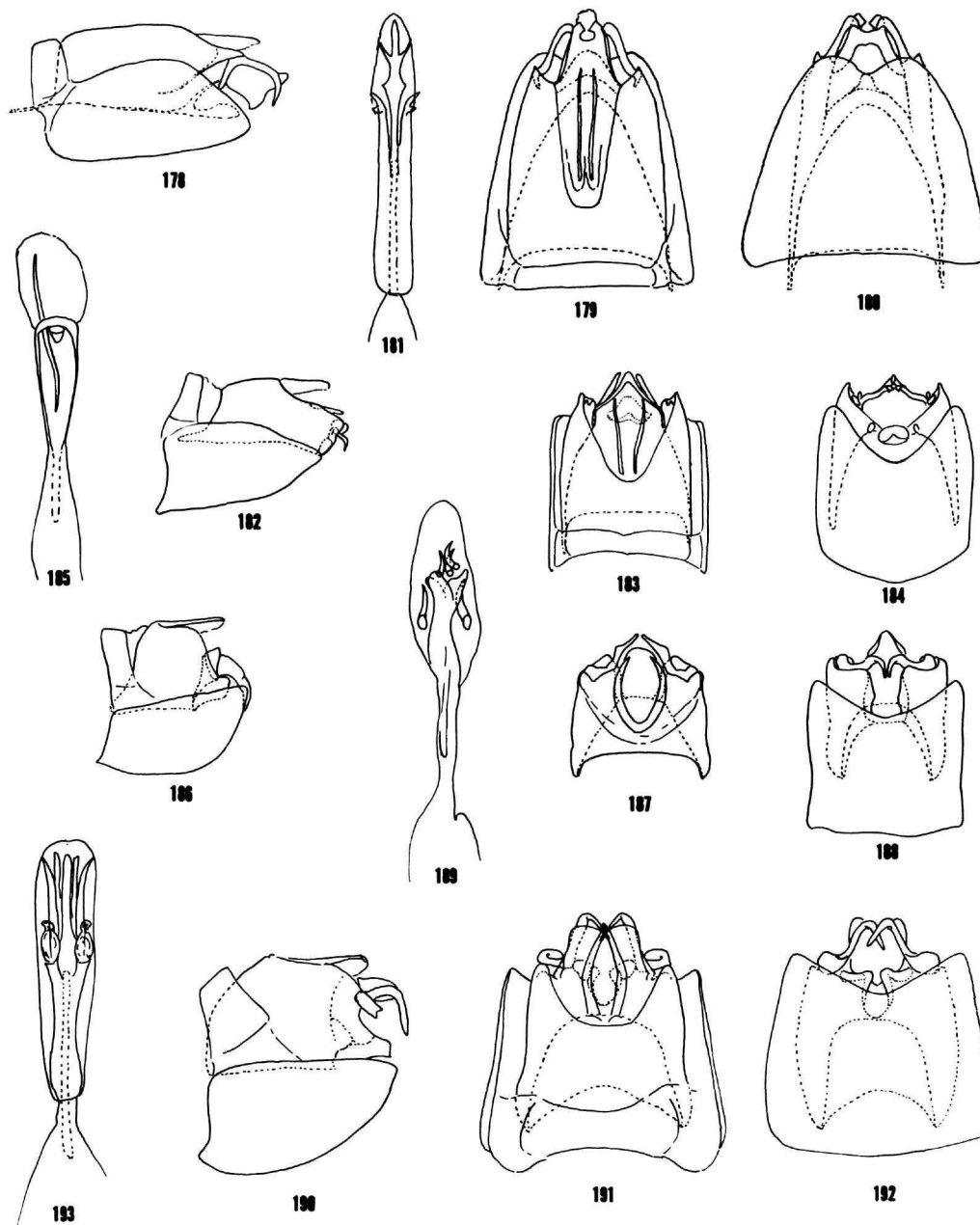
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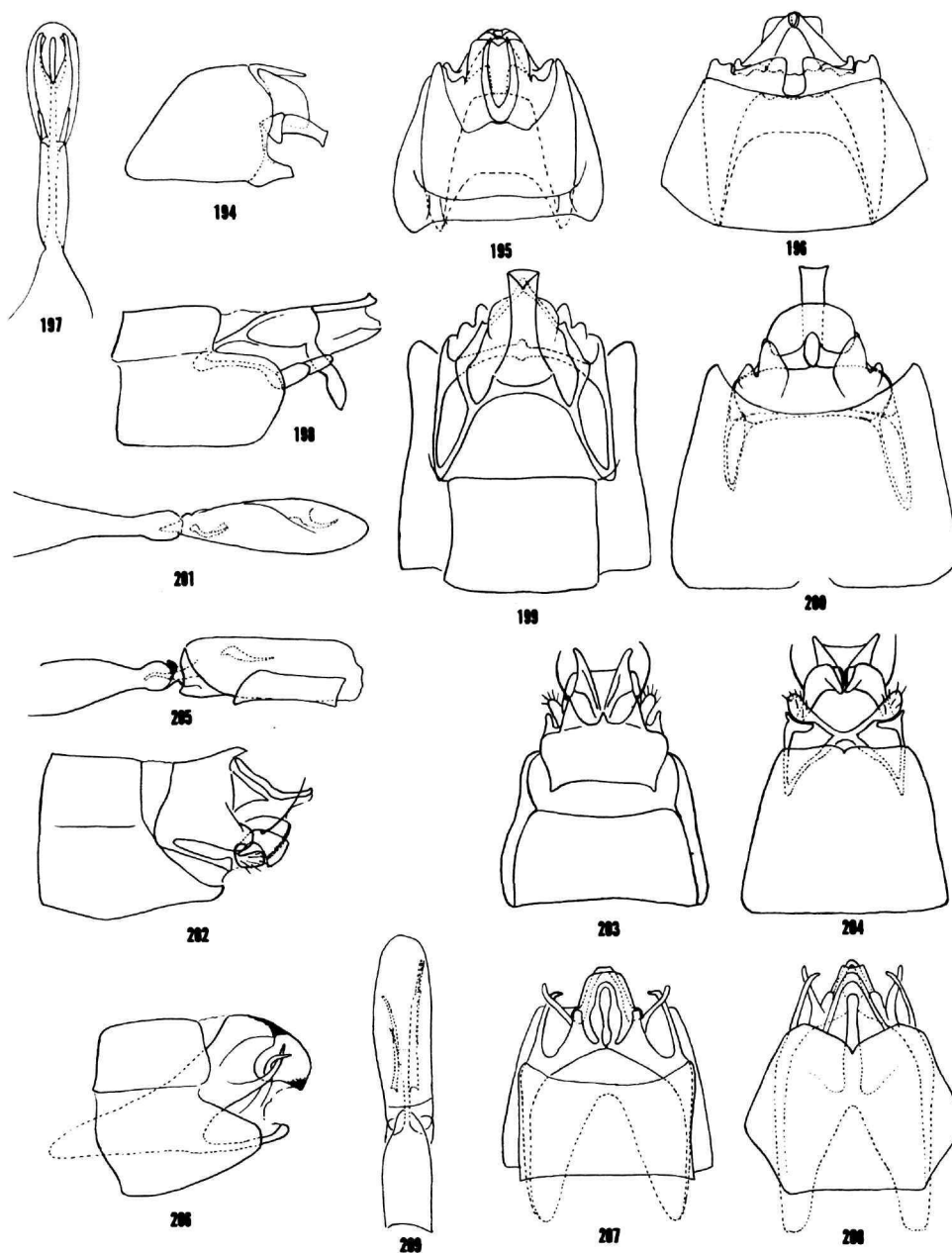
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FIGURES 165-177.—*Alisotrichia hirudopsis* Flint: 165, male genitalia, lateral; 166, male genitalia, dorsal; 167, male maxillary palpus; 168, male antenna. *A. argentilinea* Flint: 169, male genitalia, lateral; 170, male genitalia, dorsal; 171, male genitalia, ventral. *A. orophila* Flint: 172, male genitalia, lateral; 173, male genitalia, dorsal; 174, eighth sternum, ventral. *A. lobata* Flint: 175, male genitalia, dorsal; 176, eighth sternum, ventral; 177, male genitalia, lateral.

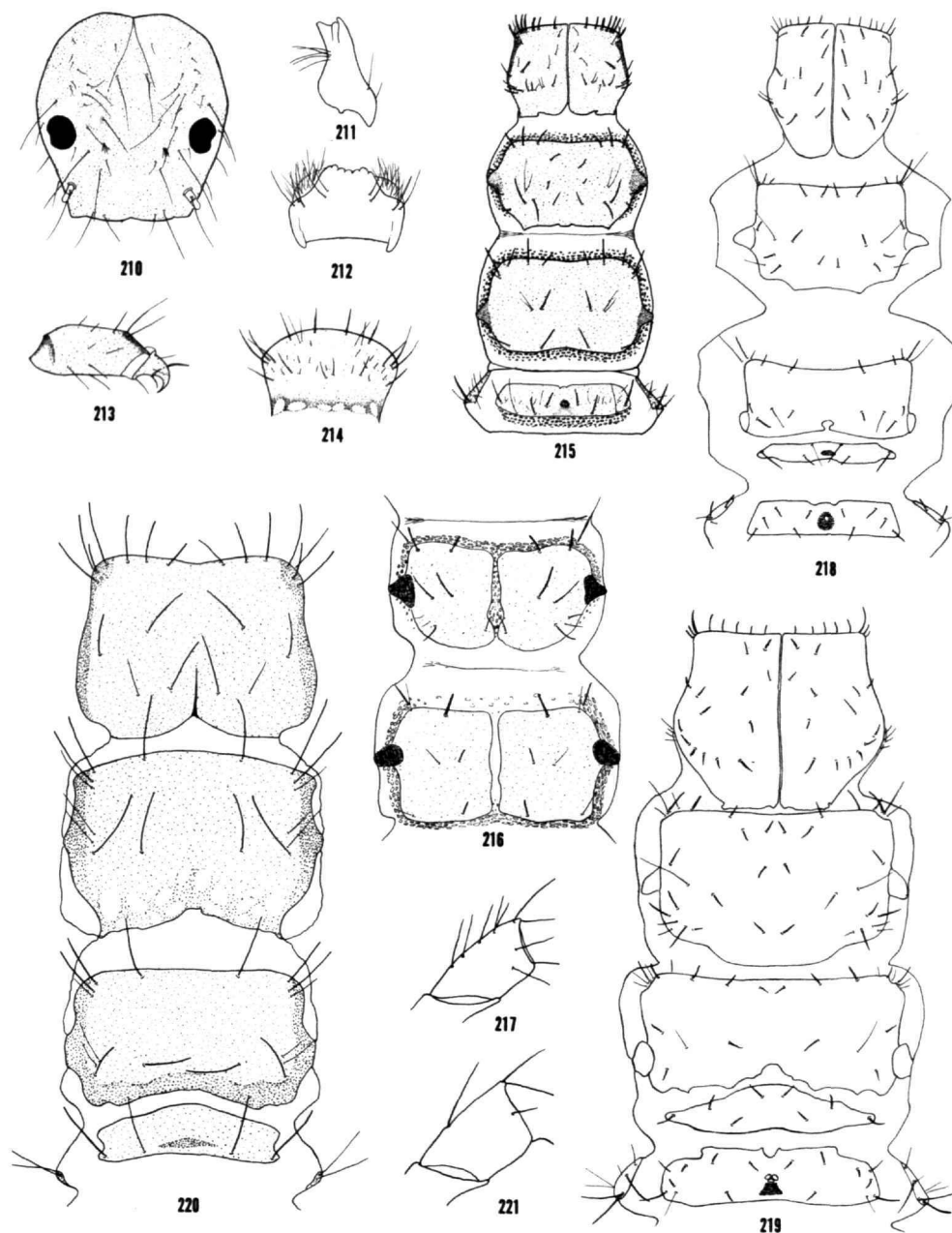


FIGURES 178–193.—*Alisotrichia chorra*, new species: 178, male genitalia, lateral; 179, male genitalia, dorsal; 180, male genitalia, ventral; 181, aedeagus, dorsal. *A. quemada*, new species: 182, male genitalia, lateral; 183, male genitalia, dorsal; 184, male genitalia, ventral; 185, aedeagus, dorsal. *A. blantoni*, new species: 186, male genitalia, lateral; 187, male genitalia, dorsal; 188, male genitalia, ventral; 189, aedeagus, dorsal. *A. tamaza*, new species: 190, male genitalia, lateral; 191, male genitalia, dorsal; 192, male genitalia, ventral; 193, aedeagus dorsal.

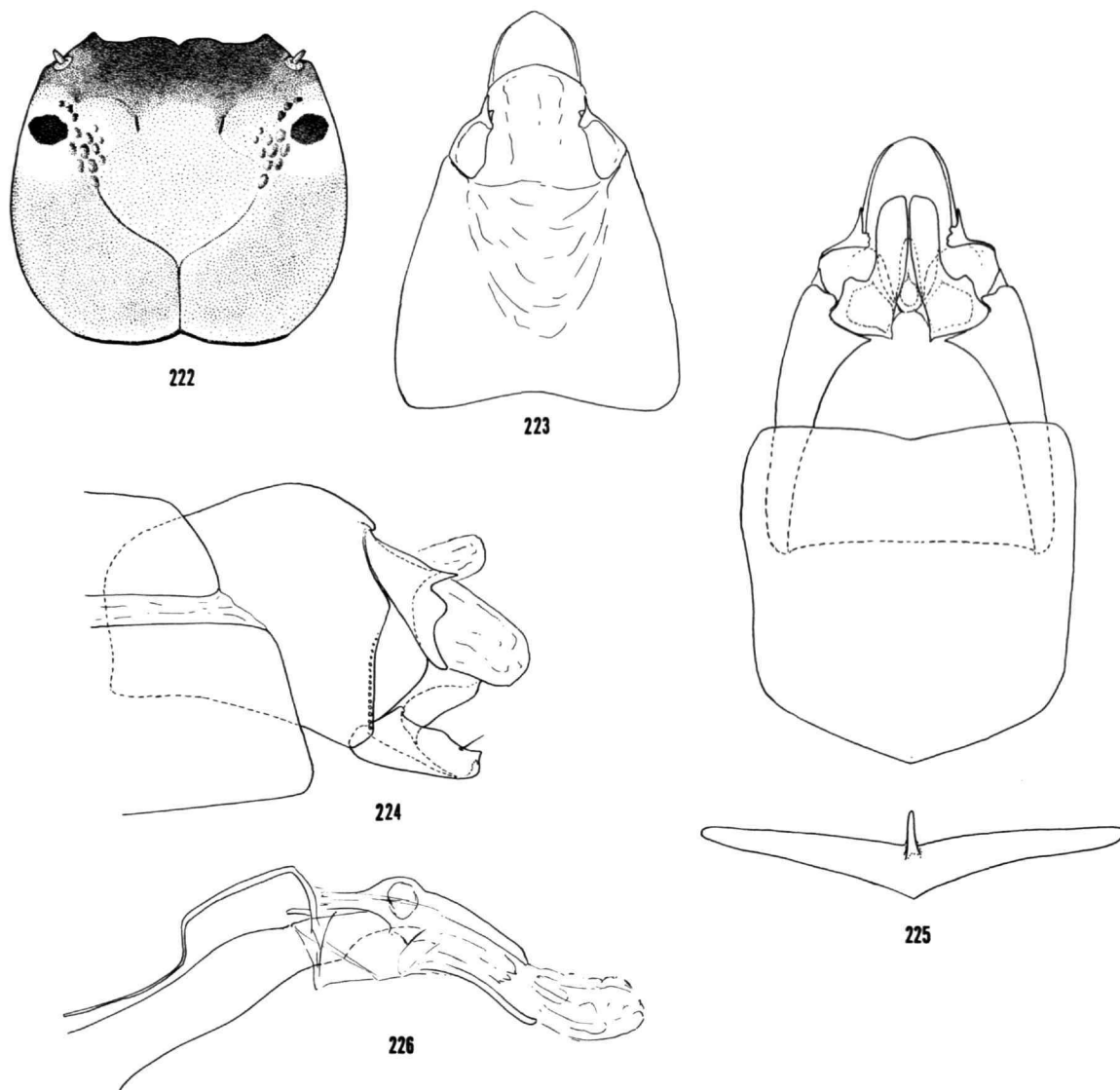


FIGURES 194-209.—*Alisotrichia trifida*, new species: 194, male genitalia, lateral (eighth segment omitted); 195, male genitalia, dorsal; 196, male genitalia, ventral; 197, aedeagus, dorsal. *A. dominicensis* Flint: 198, male genitalia, lateral; 199, male genitalia, dorsal; 200, male genitalia, ventral; 201, aedeagus, lateral. *A. wirthi* Flint: 202, male genitalia, lateral; 203, male genitalia, dorsal; 204, male genitalia, ventral; 205, aedeagus, lateral. *A. septempunctata* Flint: 206, male genitalia, lateral; 207, male genitalia, dorsal; 208, male genitalia, ventral; 209, aedeagus, dorsal.

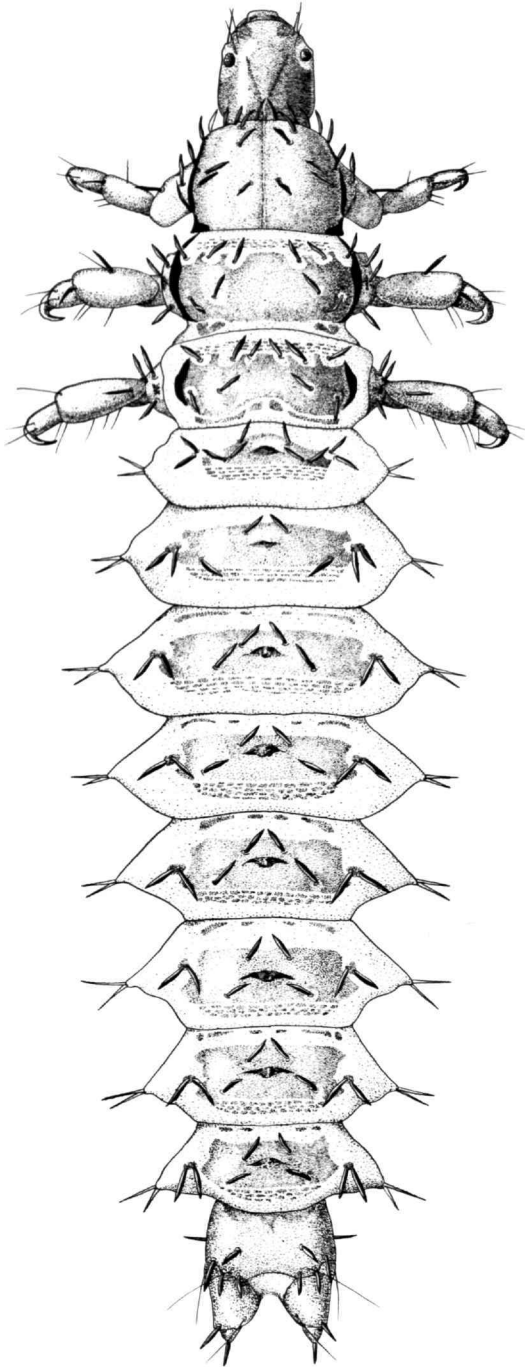




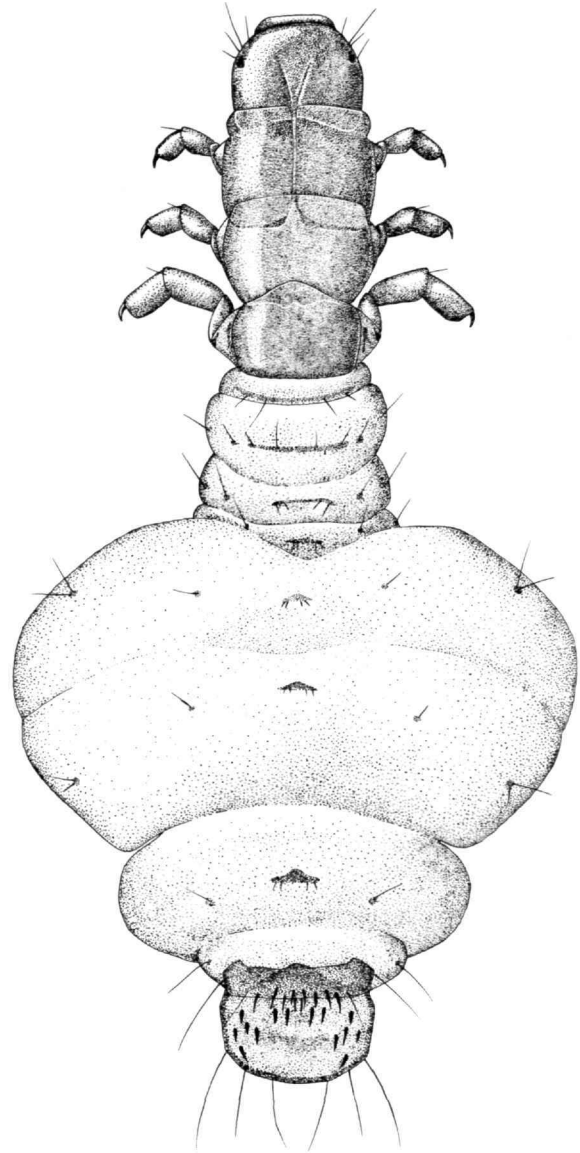
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FIGURES 222-226.—*Leucotrichia gomezi*, new species: 222, larval head, anterior; 223, male genitalia, dorsal; 224, male genitalia, lateral; 225, male genitalia, ventral; 226, aedeagus, lateral.

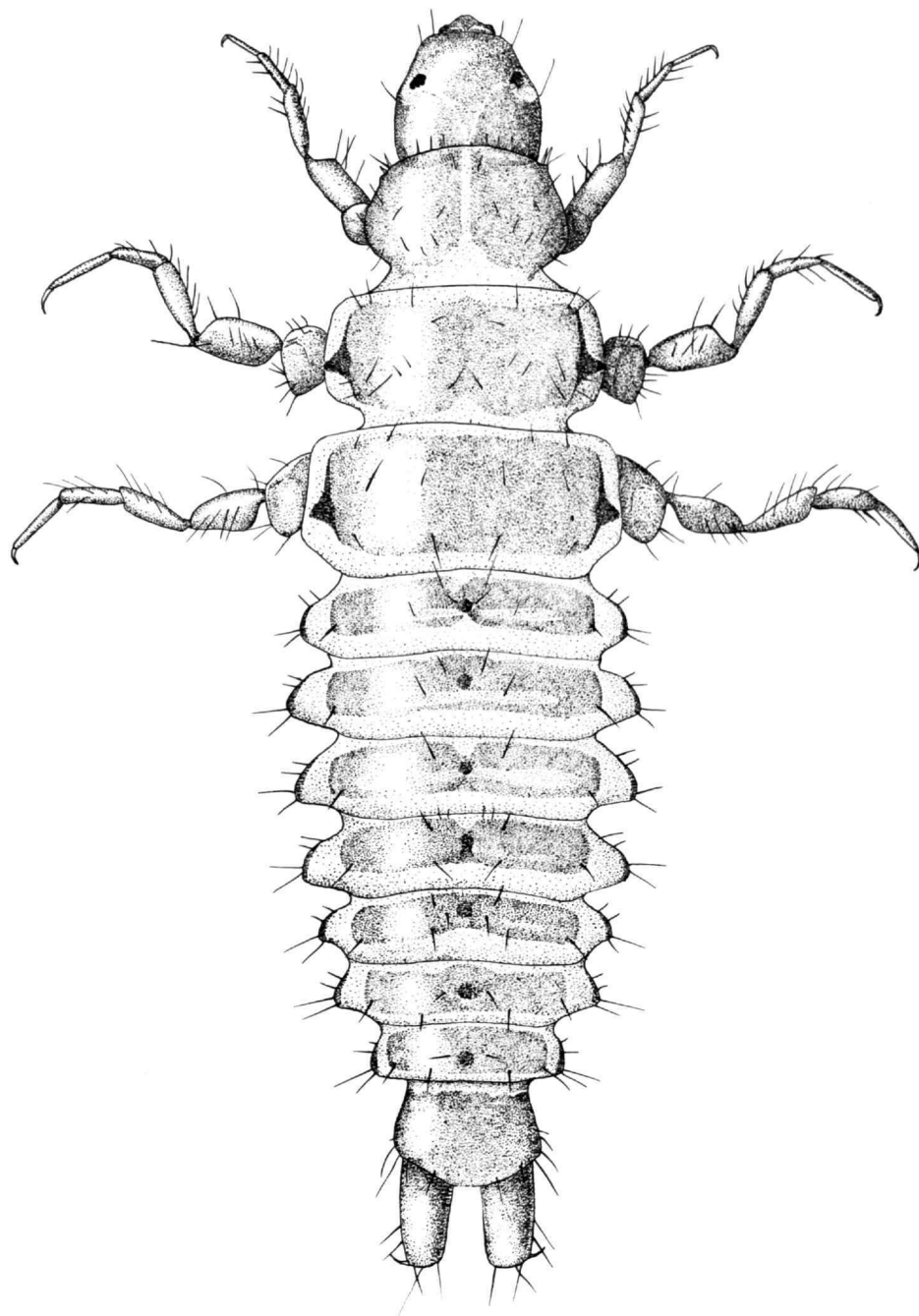


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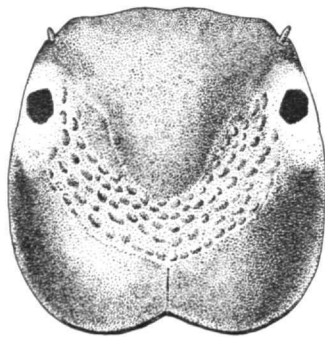
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FIGURES 227-228.—*Alisotrichia* species 2: 227, larva, dorsal. *Zumatrichia antilliensis* Flint: 228, larva, dorsal.

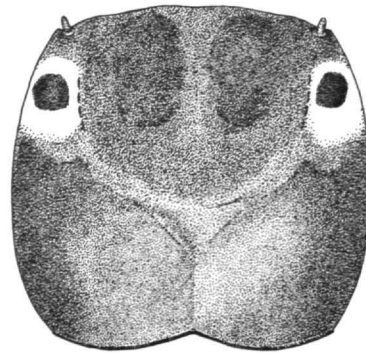


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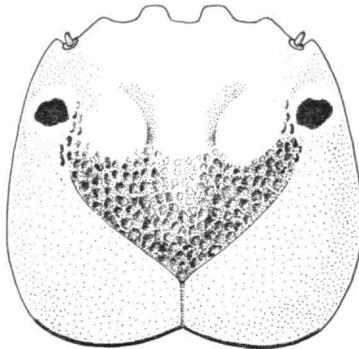
FIGURE 229.—*Alisotrichia hirudopsis* Flint, larva, dorsal.



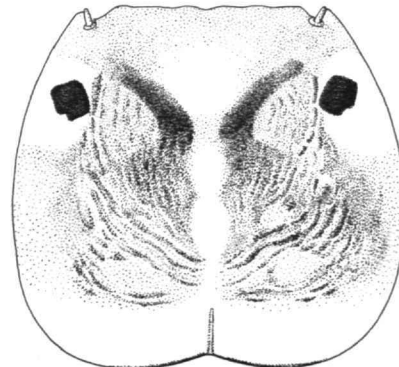
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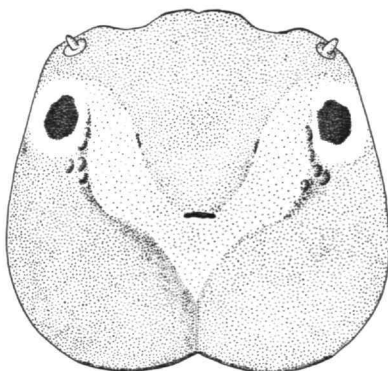
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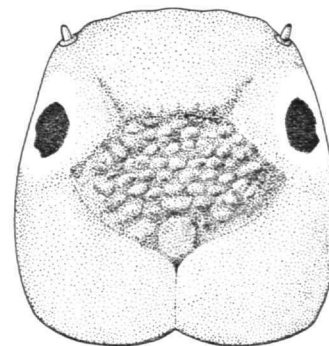
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FIGURES 230–235.—*Leucotrichia limpia* Ross: 230, larval head, anterior. *L. chiriquiensis*, new species: 231, larval head, anterior. *L. tubifex* Flint: 232, larval head, anterior. *L. imitator*, new species: 233, larval head, anterior. *Anchitrichia spangleri*, new genus, new species: 234, larval head, anterior. *Zumatrichia multisetosa*, new species: 235, larval head, anterior.

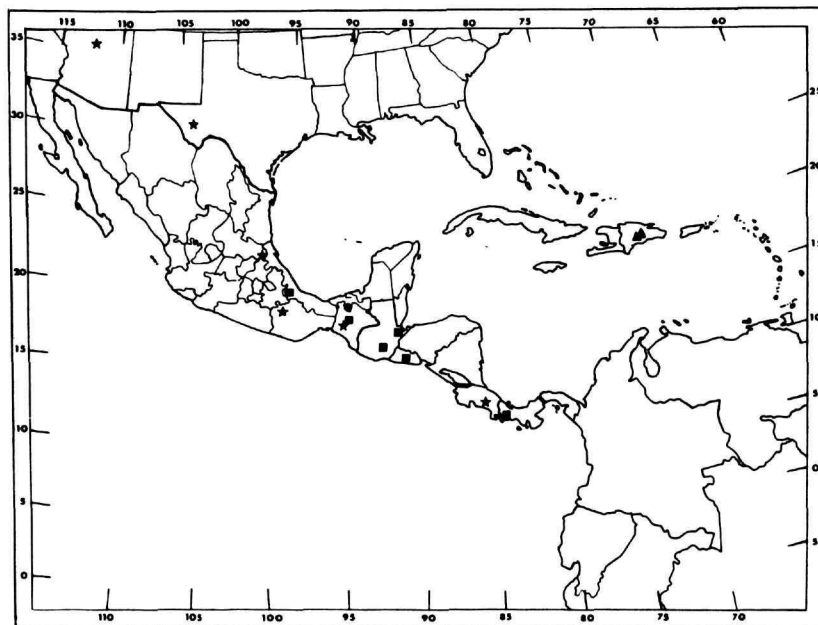


FIGURE 236.—Distribution of *Leucotrichia limpia* Ross, ★; *L. melleopicta* Mosely, ●; *L. viridis* Flint, ■; and *L. gomezi*, new species, ▲.

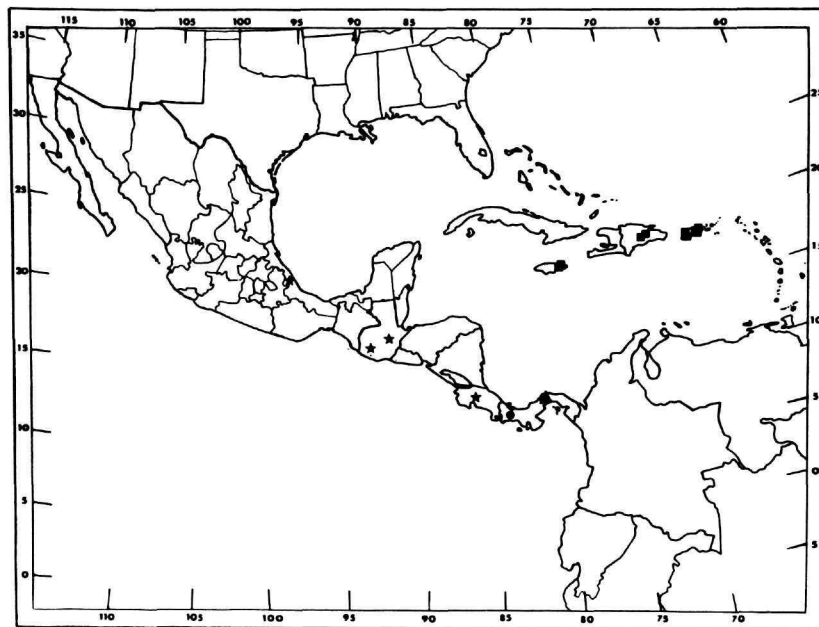


FIGURE 237.—Distribution of *Leucotrichia imitator*, new species, ★; *L. chiriquiensis*, new species, ●; *L. tubifex* Flint, ■; and *Costatrichia tripartita*, new species, ▲.



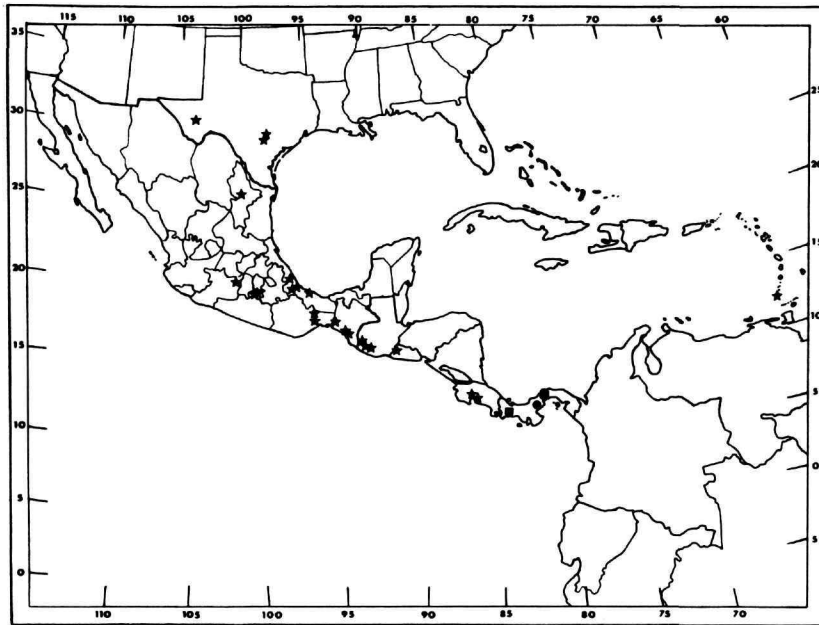


FIGURE 238.—Distribution of *Leucotrichia sarita* Ross, ★; *L. fairchildi*, new species, ●; and *Costatrichia spinifera*, new species, ■.

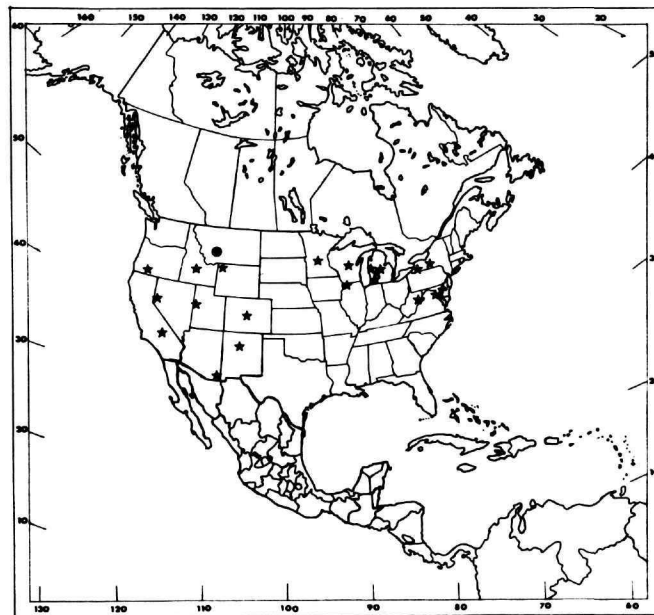


FIGURE 239.—Distribution of *Leucotrichia pictipes* (Banks), ★; and *Zumatrichia notosa* (Ross), ●.



FIGURE 240.—Distribution of *Costatrichia lodora* Mosely, ★; *C. simplex*, new species, ●; *C. bipartita*, new species, ■; and *C. panamensis* Flint, ▲.

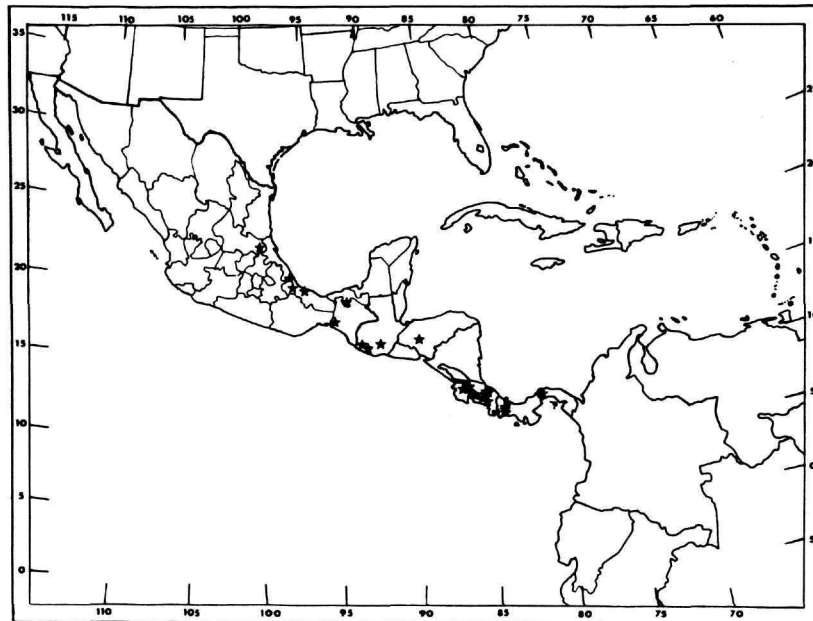


FIGURE 241.—Distribution of *Anchitrichia spangleri*, new genus, new species, ★.

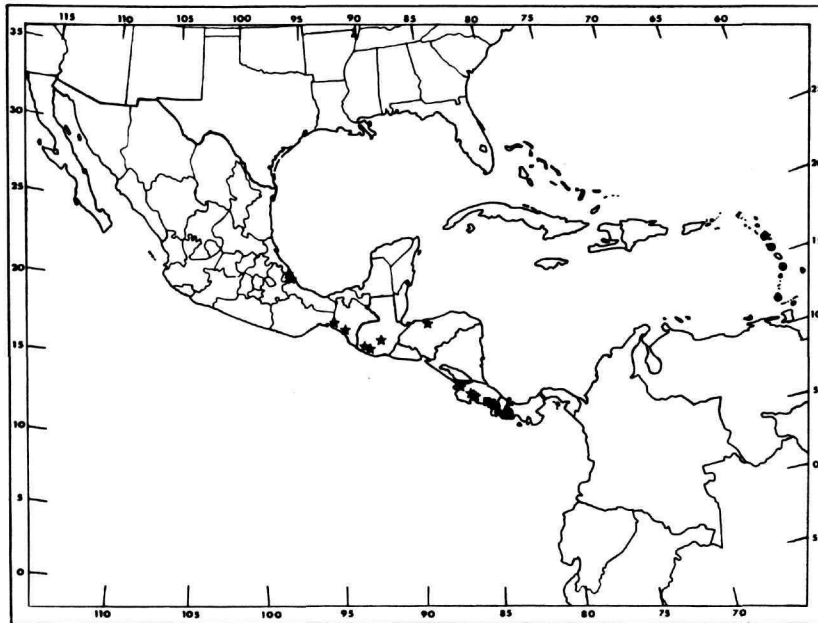


FIGURE 242.—Distribution of *Zumatrichia multisetosa*, new species, ★; *Z. antillensis* Flint, ●; *Z. vieja*, new species, ■; and *Z. angulata*, new species, ▲.

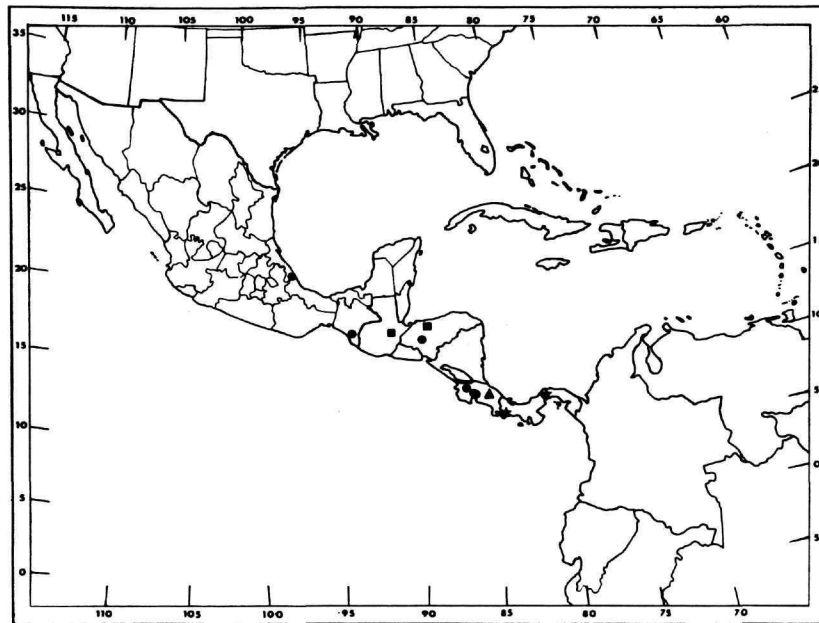


FIGURE 243.—Distribution of *Zumatrichia saluda*, new species, ★; *Z. galtena* Mosely, ●; *Z. echinata* Flint, ■; and *Z. strobilina*, new species, ▲.



FIGURE 244.—Distribution of *Zumatrichia diamphidia*, new species, ★; *Z. attenuata*, new species, ●; *Z. chiriquiensis*, new species, ■; and *Z. anomalopecta* Flint, ▲.

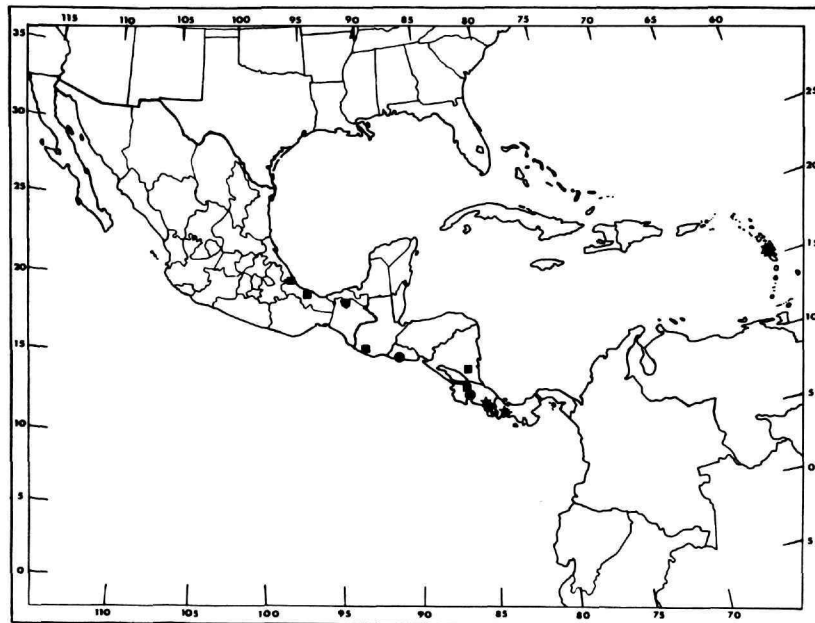


FIGURE 245.—Distribution of *Zumatrichia bifida*, new species, ★; *Z. palmara*, new species, ●; *Z. filosa* Mosely, ■; and *Alisotrichia orophila* Flint, ▲.

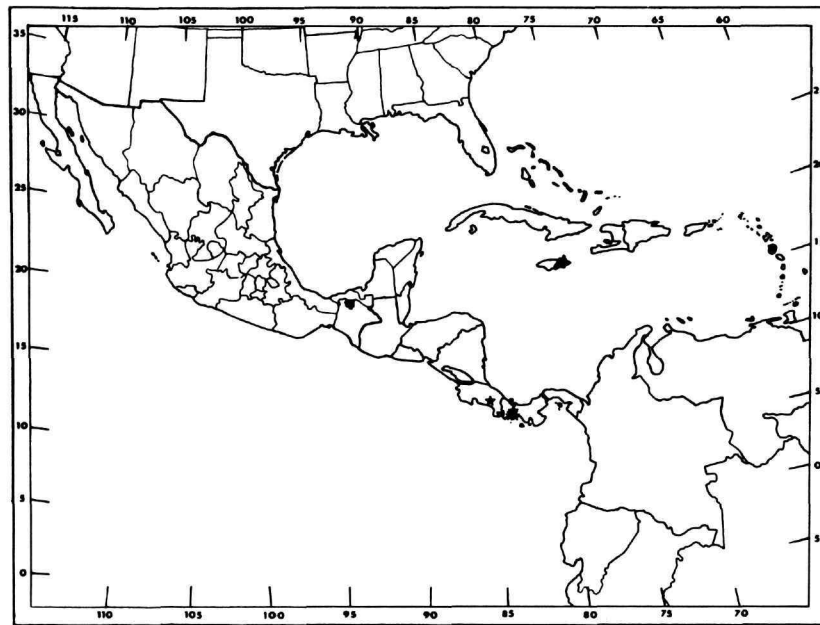


FIGURE 246.—Distribution of *Zumatrichia caudifera*, new species, ★; *Z. teapa*, new species, ■; *Alisotrichia lobata* Flint, ●; and *A. argenteilinea* Flint, ▲.

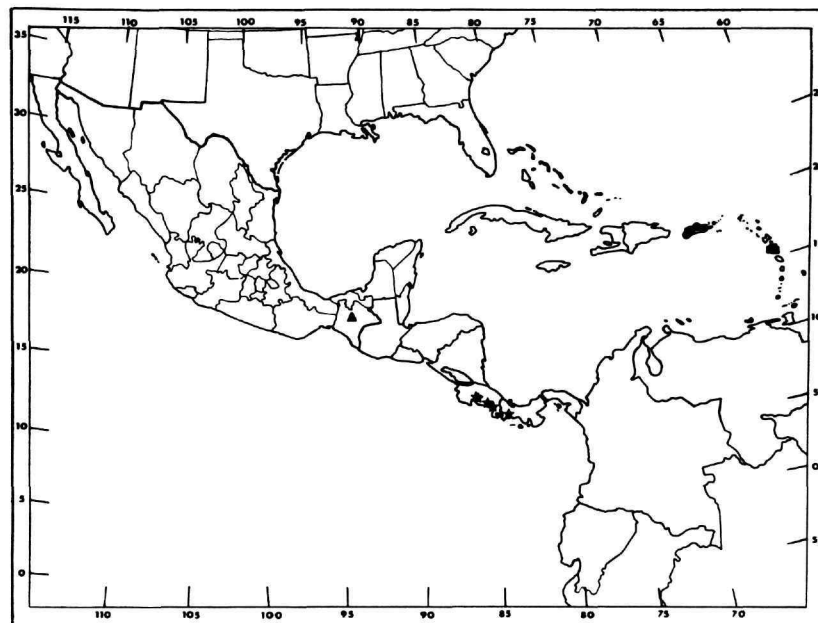


FIGURE 247.—Distribution of *Zumatrichia rhamphoides*, new species, ★; *Alisotrichia hirudopsis* Flint, ●; *A. dominicensis* Flint, ■; and *A. chorra*, new species, ▲.



FIGURE 248.—Distribution of *Alisotrichia quemada*, new species, ★; *A. wirthi* Flint, ●; *A. tamaza*, new species, ■; and *A. trifida*, new species, ▲.

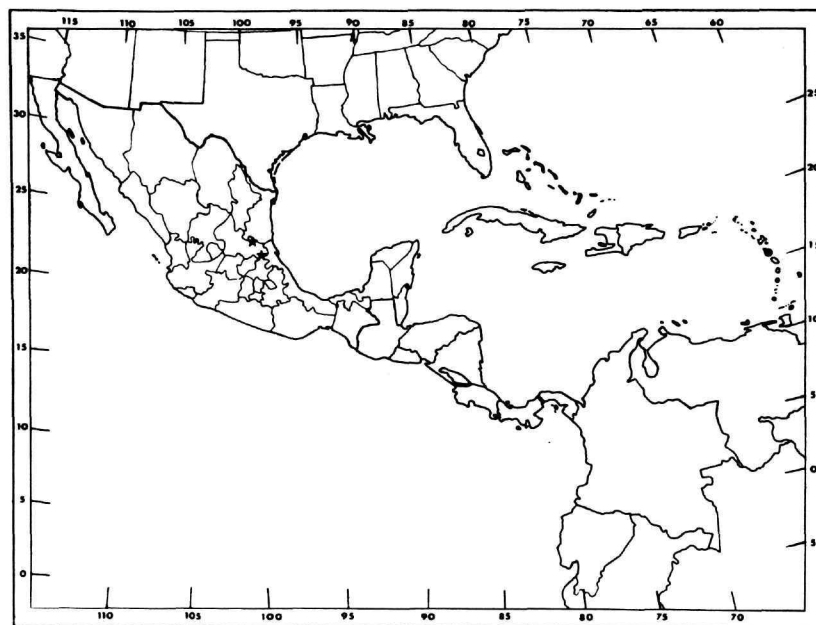


FIGURE 249.—Distribution of *Alisotrichia blantoni*, new species, ★; and *A. septempunctata* Flint, ●.

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Simple *tabulations* in the text (e.g., columns of data) may carry headings or not, but they should not contain rules. Formal *tables* must be submitted as pages separate from the text, and each table, no matter how large, should be pasted up as a single sheet of copy.

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In the *bibliography* (usually called "Literature Cited"), spell out book, journal, and article titles, using initial caps with all words except minor terms such as "and, of, the." (For capitalization of titles in foreign languages, follow the national practice of each language.) Underscore (for italics) book and journal titles. Use the colon-parentheses system for volume, number, and page citations: "10(2):5-9." Spell out such words as "figures" and "plates" (or "pages" when used alone).

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